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of budgetary participation on job performance

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in England and Wales

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corporate governance challenge

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Testing a model of the antecedents and consequences of budgetary participation on job performance

Vincent K. Chong and Darren M. Johnson*

Abstract—This paper examines the effect of antecedents (such as task exceptions and task analysability) and consequences (such as job-relevant information, budget goal level, budget goal acceptance and budget goal commitment) of budgetary participation on job performance. The responses of 135 middle-level managers, drawn from a cross-section of manufacturing firms, to a survey questionnaire, were analysed by using a structural equation modelling (SEM) technique. The results of this study suggest that task exceptions and task analysability are important antecedents of budgetary participation. The results further suggest that the cognitive effect of participation in goal-setting allows subordinates to gather, exchange and share job-relevant information. The availability of job-relevant information allows subordinates to develop effective strategies or plans, which will help them to exert effort over time, in an attempt to attain their goals. The results support the proposition that setting difficult but attainable budget goals increases subordinates' budget goal level, acceptance, and commitment to the budget goal, which in turn improves job performance.

Key words: Budgetary participation; information processing theory; goal-setting theory; job performance; structural equation modelling (SEM) technique

1. Introduction

Subordinate participation in budget-setting is one of the most researched topics in management accounting literature. The results of studies into the effects of budgetary participation on subordinates' job performance have been equivocal.¹ The inconclusive results may be due to the lack of understanding of the mechanism by which budgetary participation may affect subordinates' job performance. Brownell and McInnes (1986), for example, relied on expectancy theory and used motivation as an intervening variable to study the impact of budgetary participation on performance. However, Brownell and McInnes's results failed to

confirm a positive relationship between budgetary participation and motivation. In an attempt to resolve Brownell and McInnes's (1986) inconclusive results, Chong and Chong (2002) relied on goal-setting theory to examine the impact of budgetary participation on performance. They found that budgetary participation affects subordinates' job performance through: (1) the increase in their budget goal commitment, and (2) the cognitive benefits derived from sharing internal information during the budget-setting process.

Nevertheless, three issues merit further investigation. First, we improve on Chong and Chong (2002) by including other important motivational factors such as budget goal level (difficulty) and budget goal acceptance within the goal-setting theory framework. For example, prior studies (e.g., Locke et al., 1981; Wier, 1993) have found that budget goal level has some influence on commitment and job performance. Leifer and McGannon (1986) found that goal acceptance and goal commitment are separate and distinguishable constructs and, as such, should not be treated as the same constructs. Shields and Shields (1998) called for future research in participative budgeting to in-

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¹ For example, some studies (e.g. Merchant, 1981) have confirmed that budgetary participation has a positive effect on performance while other studies (e.g. Stedry, 1960; Bryan and Locke, 1967) have found the relationship to be negative and yet, few studies (e.g. Milani, 1975; Kenis, 1979) have found that there were no relationships between budgetary participation and performance.

clude other variables (such as goal acceptance) that intervene between participative budgeting and dependent variables. Second, Chong and Chong relied on a *single* theoretical framework (i.e., goal-setting theory), despite prior researchers (Feyerabend, 1981; Eisenhardt, 1988; Conlon and Parks, 1990) claim that a multi-theoretical framework can enhance our understanding of phenomena.² Third, Chong and Chong focused on the *consequences* of budgetary participation without considering its causal antecedents. This has been a major criticism of prior budgetary participation studies (see e.g., Clinton et al., 1992; Shields and Young, 1993; Shields and Shields, 1998).

Thus, the objective of this study is to attempt to partially replicate and extend Chong and Chong (2002) by developing a model (see Figure 1), which relies on a multi-theoretical framework (i.e., goal-setting theory and information-processing theory) to examine the impact of budgetary participation on subordinates' job performance.

Specifically, this study proposes that task uncertainty is an antecedent of budgetary participation. This study focuses on only one of the antecedents of budgetary participation, namely task uncertainty, as the theoretical development underpinning this study is concerned with the *internal* environment. It is suggested that the presence of task uncertainty (in term of task exceptions and task analysability) causes the need for job-relevant information and budgetary participation (Links 1, 2, 3 and 4 of Figure 1). We suggest that subordinates' participation in the budget-setting process provides the opportunity for them to gather job-relevant information which will facilitate their decision making process (Link 5, Figure 1). In addition, we propose that by relying on goal-setting theory, subordinates' participation in the budget-setting process induces higher budget goal level, budget goal acceptance and commitment (Links 6, 7 and 8 of Figure 1). It is suggested that the higher the budget goal level, the higher the level of budget goal acceptance (Link 9 of Figure 1) and

the higher the level of budget goal commitment (Link 10 of Figure 1). In addition, it is proposed that the higher the level of budget goal acceptance, the higher the level of budget goal commitment (Link 11 of Figure 1). Finally, we propose that the use of both information-processing theory and goal-setting theory suggests that the availability of job-relevant information will facilitate subordinates who have high budget goal acceptance and commitment to enhance their job performance (Links 12, 13 and 14 of Figure 1).

The remainder of this paper is organised as follows. In the next section, the theoretical model underlying the study is developed. Subsequent sections present the method employed, results, discussions and limitation of the study.

2. Literature review and hypotheses development

2.1. The relationship between task uncertainty and budgetary participation

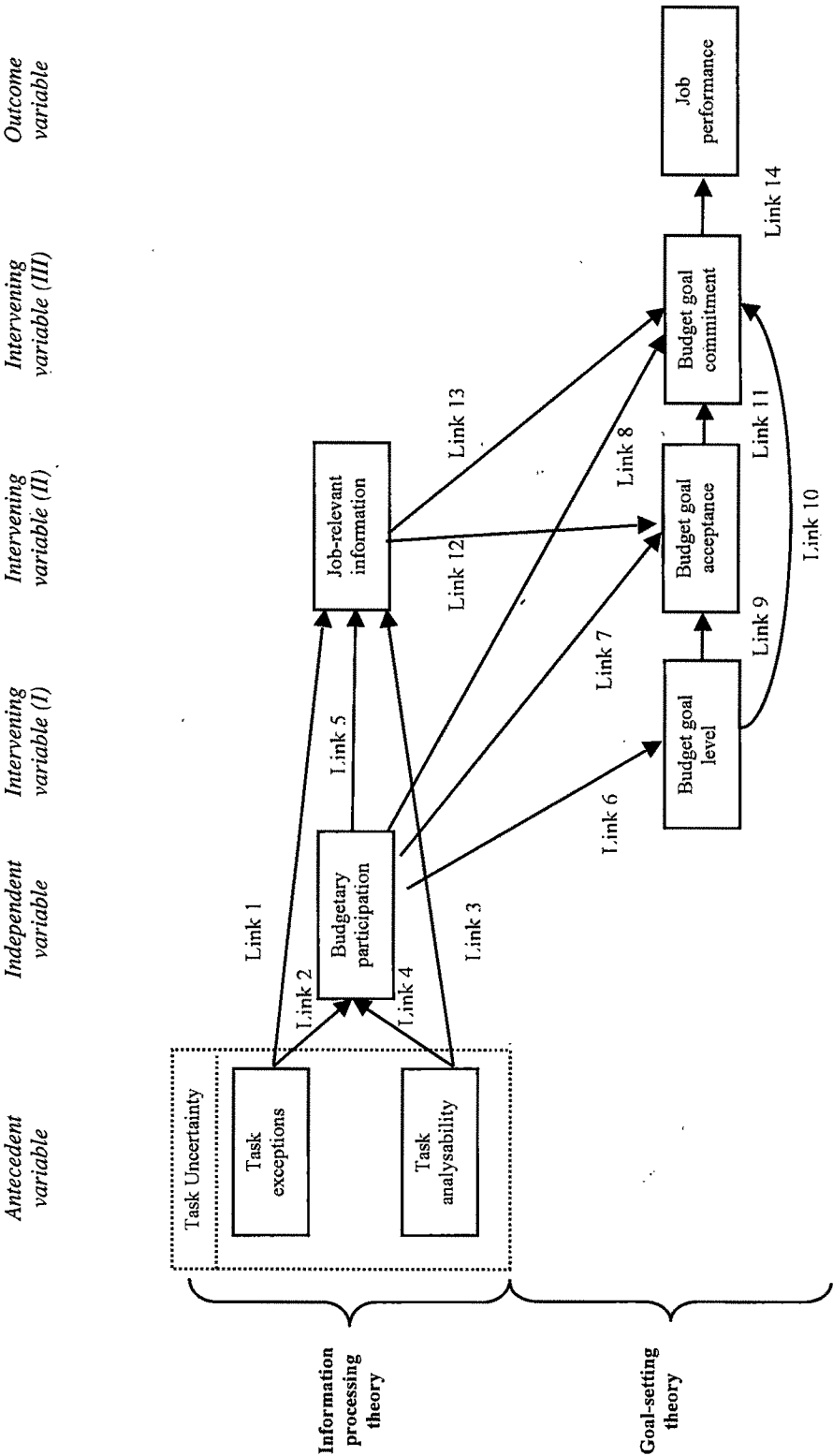
The first two hypotheses are concerned with the relationship between task uncertainty and budgetary participation. Task uncertainty is conceptualised as consisting of two dimensions: task exceptions and task analysability (see Perrow, 1967; Van de Ven and Delbecq, 1974; Withey et al., 1983; Brownell and Dunk, 1991).³ Task exceptions refer to 'the frequency of unexpected and novel events that occur in the conversion process'; while task analysability refers to 'the extent to which work can be reduced to programmable mechanical steps' (Withey et al., 1983:46; Brownell and Dunk, 1991). Budgetary participation, on the other hand, is defined as "a process in which individuals, whose performance will be evaluated, and possibly rewarded, on the basis of their achievement of budgeted targets, are involved in, and have influence on, the setting of these targets" (Brownell, 1982:124; Greenberg, Greenberg and Nouri, 1984). Relying on information-processing theory (Galbraith, 1973, 1977), it is argued that 'the greater the task uncertainty, the greater the amount of *job-relevant information* that must be processed among decision-makers during task execution in order to achieve a given level of performance' (Galbraith, 1973:4, *italicisation added*).⁴ This view is supported by the extant organisational and behavioural literature (e.g., Hague et al., 1971; Duncan, 1972; Van de Ven et al., 1976; Tushman and Nadler, 1978). For example, Tushman and Nadler (1978) identified that in situations involving simple and routine tasks, information-processing requirements are kept to a minimum; as such tasks can be solved by existing rules and procedures. Tasks that are not well understood prior to execution and complex in nature require additional processing of information by

² To date, the participative budgeting studies have relied on agency theory (e.g., Shields and Young, 1993), attribution theory (e.g., Nouri, et al., 1999), expectancy theory (e.g., Brownell and McInnes, 1986), goal-setting theory (e.g., Chong and Chong, 2002), and information-processing theory (e.g., Kren, 1992).

³ Van de Ven and Delbecq (1974:183–184) conceptualised task exceptions as task variability and defined it as being 'the number of exceptional cases encountered in the work requiring different methods or procedures for doing the work', and task analysability is conceptualised as task difficulty and defined as the "analysability of the work itself and the extent to which there is a known procedure that specifies the sequence of steps to followed in performing the task'.

⁴ Job-relevant information reduces uncertainty, improves decision-makers' ability to make predictions, or confirms or corrects their prior expectations (see Romney and Steinbart, 2003).

Figure 1
Theoretical model



decision-makers. Van de Ven et al. (1976:328) established that further information is necessary when task uncertainty occurs at the work unit level of the organisation; and the additional information would be obtained through the use of horizontal communication channels and both scheduled and unscheduled group meetings. Thus, subordinates faced with a high level of task uncertainty would seek additional job-relevant information through budgetary participation. This viewpoint is further supported by Mia (1987), who argued that when employees participate to obtain and process additional information about their jobs, they get a clearer understanding of their job and their levels of perceived task difficulty are reduced. Shields and Shields (1998) maintained that budgetary participation is for the sharing of internal information that is predicted to be associated with task uncertainty. Specifically, Shields and Shields found that budgetary participation exists for when there is task uncertainty. The foregoing discussion suggests that task uncertainty is an antecedent variable of budgetary participation. It is postulated that the demand for budgetary participation is caused by the subordinates' levels of task uncertainty. Thus, it is argued that the existence of budgetary participation for sharing of internal information is expected to be associated with subordinates' levels of task uncertainty.

As noted earlier, task uncertainty is conceptualised as having two dimensions: task exceptions and task analysability. It is proposed that when task exceptions are low, such tasks would be considered as either repetitious or routine and could be solved through existing procedures and rules (Tushman and Nadler, 1978). When confronted with these tasks, it is expected that subordinates require less job-relevant information for decision-making. However, when task exceptions are high, subordinates would not be able to predict the problems in advance (e.g., Perrow, 1967; Withey et al., 1983). Thus, it is suggested that subordinates who are faced with tasks that have a high number of exceptions will require additional job-relevant information. As noted earlier, subordinates can obtain additional job-relevant information through budgetary participation (e.g. Campbell and Gingrich, 1986; Mia, 1987; Shields and Shields, 1998). Thus, it follows that when task exceptions are high, the need for participation is likely to be high. Hence, it is postulated that task exceptions are expected to be positively associated with job-relevant information and budgetary participation. The following hypotheses, stated formally, are tested:

H1(a): There is a positive relationship between task exceptions and job-relevant information.

H1(b): There is a positive relationship between task exceptions and budgetary participation.

With respect to task analysability, it is suggested that readily analysable tasks may be solved by existing procedures and rules (e.g., Perrow, 1967; Withey et al., 1983). It is expected that subordinates require less job-relevant information for decision making when confronted with these tasks. However, when the level of task analysability is low, subordinates may need time to think and to search beyond existing procedures and policies. Thus, it is expected that subordinates faced with tasks that have a low level of analysability will require additional job-relevant information. This information will be obtained through participation within the budgeting process (e.g. Campbell and Gingrich, 1986; Mia, 1987; Shields and Shields, 1998). Thus, it follows that when task analysability is low, the need for participation is likely to be high. Hence, it is predicted that task analysability is expected to be negatively associated with job-relevant information and budgetary participation. The following hypotheses, stated formally, are tested:

H2(a): There is a negative relationship between task analysability and job-relevant information.

H2(b): There is a negative relationship between task analysability and budgetary participation.

2.2. *The relationship between budgetary participation and job-relevant information*

Our third hypothesis is concerned with the relationship between budgetary participation and job-relevant information. Job-relevant information is defined as "information that facilitates job-related decision making" (Kren, 1992:511). Prior studies (e.g., Kren, 1992; Magner et al., 1996; Chong and Chong, 2002) have examined the cognitive role of budgetary participation. These studies confirmed that budgetary participation facilitates the gathering of job-relevant information. For example, Kren (1992:513) argued that budget participation can create an environment that encourages the acquisition and use of job-relevant information. Magner et al. (1996) argued that subordinates' participation in the budget-setting process enables them to obtain information that is relevant to performing their jobs.⁵ Magner et al. (1996:43) further argued that the act of participation allows subordinates to interact with superiors whereby subordinates can ask questions to clarify goals, work strategies, conditions in the work environ-

⁵ Numerous non-accounting studies (e.g., Earley and Kanfer, 1985; Campbell and Gingrich, 1986) also support this argument.

ment, and other factors that are salient to their jobs. In addition, Chong and Chong (2002) found that budgetary participation provided an opportunity for subordinates to gather, exchange, and disseminate job-relevant information with their superiors or peers regarding their work environment and budget goals. Murray (1990), on the other hand, theorised that budgetary participation might help to enhance performance by providing individuals the opportunity to ask questions related to the tasks, thereby increasing their job-relevant information. Shields and Shields (1998:59) suggested that the cognitive role of budgetary participation improves a subordinate's quality of decisions as a result of sharing information with the superior.⁶ Based on the preceding discussions, we conclude that the cognitive role of budgetary participation is expected to increase job-relevant information. Thus, stated formally, the following hypothesis is tested:

H3: There is a positive relationship between budgetary participation and job-relevant information.

2.3. *The relationships between budgetary participation, budget goal level, budget goal acceptance, and budget goal commitment*

Relying on goal-setting theory (Locke, 1968; Locke et al., 1981; Locke and Latham, 1990; see also Murray, 1990; Chong and Leung, 2003), it is suggested that participation in setting budget goals can influence subordinates' budget goal level and motivation.⁷ It is suggested that setting difficult but attainable goals leads to higher performance than setting either specific moderate or easy goals (e.g., Murray, 1990; Locke and Latham, 1990). The mechanisms by which difficult goals lead to greater action is centred around three elements of motivation. These are: (1) intensity of effort, (2) duration or time, and (3) direction towards an activity (see Locke and Latham, 1990). Specifically, Locke and Latham (1990) argued that specific and difficult goals caused a greater effort to be expended over a greater period of time in comparison to those goals considered as easy or 'do your best'. They (p. 92) suggested that goals have two directional effects. 'First, they *orient* the individual toward goal-relevant activities and materials, and away from goal irrelevant ones. Second, they *activate* stored knowledge and skills that the individual possesses that are perceived as relevant to the task.' Therefore, if effort is directed towards the activity or goal, then it is more likely the goal can be reached. Thus, difficult goals in comparison to easy goals will lead to greater effort being expended, over an extended period of time providing that effort is expended towards some goal.⁸

Participation enhances an individual's feeling of involvement in the budget goal-setting process.

Numerous studies (Latham et al., 1978; Kenis, 1979; Kren and Liao, 1988; Murray, 1990; Wier, 1993) have proposed that budgetary participation is positively associated with budget goal level. Kren and Liao (1988), for example, argued that subordinates may be motivated to disclose information during the participation process that results in the setting of more difficult budget goal level. Murray (1990) theorised that budgetary participation may result in increased budget goal level. Wier (1993) found that budgetary participation was positively associated with budget goal level. Thus, the existing theoretical and empirical evidence suggest that budgetary participation is positively related to budget goal level.

Budget goal acceptance refers to the extent to which an individual's willingness to accept a budget goal level. Budget goal commitment, on the other hand, refers to 'the determination to achieve a goal, and the willingness to put forth effort to attain a goal' (Renn et al., 1999:107–108; see also Naylor and Ilgen, 1984; Leifer and McGannon, 1986). Prior studies (see e.g., Argyris, 1952; Becker and Green, 1962; Murray, 1990; Shields and Shields, 1998; Chong and Chong, 2002) suggested that subordinates who are allowed to participate in setting their budget goals are more likely to *accept* and *commit* to the budget goals than subordinates who are not allowed to participate in the budget-setting process. Shields and Shields (1998) argued that budgetary participation increases an individual's trust, sense of control, and ego-involvement with the organisation. Consequently, this individual is more likely to be less resistance to change and more acceptance of, and commitment to, the budget decisions.

⁶ A number of non-accounting studies also confirmed the cognitive role of budgetary participation (see e.g., Locke et al., 1981; Locke and Latham, 1990; Latham et al., 1994).

⁷ The implications of these studies suggested that budgetary participation provides 'positive' communication between superiors and subordinates. It is argued that budgetary participation motivates subordinates to reveal their private information in their budgets. In other words, individuals who participate in the budget-setting process do not incorporate budgetary slack in their budget and as a result, set higher goals for themselves. However, other study studies (e.g., Shields et al., 2000; Lukka, 1988) predicted and found a negative association between participative budgeting and goal level. These studies, however, relied on the economic theory of agency. Agency theory-based studies predict that subordinates have the incentive to set an *easy* (lower) budget goal level especially their rewards are based on their ability to attain the budget goal level which they participated in the setting process. The present study relies on goal-setting theory.

⁸ Evidence from previous research (e.g. Bavelas and Lee, 1978) confirmed that goals that are specific and difficult will cause individuals to work longer and harder compared goals that are easy. For example, Bavelas and Lee (1978) found that individuals with easy goals generally stopped working on their goals sooner than those individuals who had difficult or harder goals.

Furthermore, it is argued that the intention or actions of the individual cannot be translated into the appropriate goals or behaviours without the individual acceptance of a goal (Locke 1968). Erez and Kanfer (1983) argued that employees who participated in establishing their annual budget goals, experienced the feeling of involvement and less resistance toward the goal-setting process than the employees who were not allowed to participate. Specifically, Erez and Kanfer found that budgetary participation was a valuable motivational tool in ensuring subordinates' acceptance of the budget goals. It is argued that a goal is more likely to be accepted by subordinates when they have a *voice* in setting it (see Locke and Latham, 1990).⁹ Renn (1998:116) found that 'participation enhances one's feeling of involvement in the goal-setting process. In so doing, participation lower one's resistance to accepting an externally imposed goals'. Several studies supported the positive association between budgetary participation and budget goal commitment (see e.g., Locke, 1968; Erez et al., 1985; Erez and Arad, 1986).

In summary, the preceding discussions suggest that *budgetary participation exists to induce higher budget goal level, and promote more acceptance of, and commitment to, budget goals*. These ideas are expressed in the following hypotheses:

- H4:** There is a positive relationship between budgetary participation and budget goal level.
- H5:** There is a positive relationship between budgetary participation and budget goal acceptance.
- H6:** There is a positive relationship between budgetary participation and budget goal commitment.

2.4. The relationships between budget goal level, budget goal acceptance, and budget goal commitment

Relying on goal-setting theory, it is argued that an individual's behaviour is regulated by his or her conscious ideas and intentions. A goal is viewed as the objective or the performance level that an individual seeks to attain. If an individual is committed to goal attainment, it will influence the individual's actions and consequently performance. Furthermore, it is suggested that goal-setting influences the amount of, and duration of the effort expended (Murray, 1990; see also Locke et al., 1981; Locke and Latham, 1990). Murray (1990) argued that a more difficult goal (assuming that it has been accepted and committed) should induce more effort. Prior studies (Murray, 1990; Shields and Shields, 1998) have proposed that when sub-

ordinates are given the opportunity to set their budget goal levels, they are more likely to accept and commit to the budget goals than subordinates who are not allowed to participate in the budget goal-setting process. Furthermore, participative budgeting increases an individual's trust, sense of control, and ego involvement with the organisation (Shields and Shields, 1998). Hence, it is argued that a budget goal level is more likely to be accepted and committed by an individual who participated in setting such goal level. Thus, it is predicted that budget goal level is positively associated with budget goal acceptance and budget goal commitment. Thus, stated formally, the following hypotheses are tested:

- H7:** There is a positive relationship between budget goal level and budget goal acceptance.
- H8:** There is a positive relationship between budget goal level and budget goal commitment.

Prior studies (Locke et al., 1981; Leifer and McGannon, 1986) have confirmed that there is a positive and direct effect of goal acceptance on goal commitment. Locke et al. (1981) recognised that goal acceptance and goal commitment were similar yet separate concepts. They referred goal acceptance as being the initial agreement or acceptance of a goal, whereas goal commitment is the determination to try for a goal until it has been reached. Determination, of course, implies the expending of effort, time and direction towards the relevant activity or goal. It is argued that once a goal has been accepted, then there is subsequent commitment to that goal. In analysing studies from 1960 to 1980, Locke et al. (1981) found that in those studies where acceptance had been measured and included, most of the participants showed complete and substantial commitment to the goal. Leifer and McGannon (1986) proposed that higher levels of goal acceptance should always lead to higher levels of goal commitment. Thus, it can be concluded that when a subordinate accepts a budget goal, there will be a greater commitment to that goal in comparison to a subordinate that does not accept the budget goal. Thus, it is predicted that budget goal acceptance is positively associated with budget goal commitment. These ideas are expressed as the following hypotheses:

- H9:** There is a positive relationship between budget goal acceptance and budget goal commitment.

2.5. The relationship between job-relevant information and budget goal acceptance and budget goal commitment

Existing studies (e.g., Kren, 1992; Magner et al., 1996; see also Chong, 1996) and information-pro-

⁹ Voice provides a subordinate with an opportunity to express his/her views about a decision (Earley and Lind, 1987).

cessing theory (see Galbraith, 1973, 1977; Tushman and Nadler, 1978) have provided evidence to suggest that as task uncertainty increases, the need for job-relevant information becomes increasingly important and useful to managers for decision-making purposes.

Relying on goal-setting theory, it is argued that once a subordinate has accepted a budget goal, which is specific and difficult but attainable, the three direct mechanisms (i.e., effort, persistence and direction of attention) of goal-setting are brought into play.¹⁰ These three direct mechanisms of goal-setting are motivational because it requires individuals to take actions involving hard works to accomplish the objective. If an individual finds that these mechanisms are not sufficient (e.g., due to the presence of task uncertainty), he/she may attempt to discover other better strategies for performing the task. Thus, we argue that with the presence of task uncertainty, the three direct mechanisms *alone* are not sufficient to help a subordinate to attain his/her goal. This is because subordinates need to develop task-relevant strategies, in order to discover *how* their goal can be reached. Thus, we postulate that the presence of task uncertainty motivates subordinates to exert *greater effort* directed toward strategy development (Locke and Latham, 1990; see also Hirst, 1987). The cognitive effect of budgetary participation enables subordinates to develop strategies to achieve the relevant task, and consequently these task strategies ensure that the subordinates direct their effort and attention towards the appropriate goal (see Chong and Chong, 2002). Campbell et al., (1970), for example, argued that goal-setting helped to clarify the task to be performed to the extent that they give subordinates explicit knowledge of where to direct their effort. Hirst (1987) theorised that the cognitive activities, such as the interpretation, search and selection of job-relevant information, would allow subordinates to put forth additional effort to attain their goal.

In summary, we expect that with the presence of task uncertainty, participative budget goal-setting stimulates individual to develop effective strategies, which involves both the search for, and selection of, valid strategies, for attaining goals (Locke et al., 1981; Naylor and Ilgen, 1984; Hirst, 1987; Locke and Latham, 1990). In the present study, we expect that there is no direct relationship between job-relevant information and job performance for our structural model (see Figure 1). We offer the following two plausible reasons. First, our structural model includes task uncertain-

ty as an antecedent variable to budgetary participation. Second, relying on information-processing theory and goal-setting theory, we argue that the presence of task uncertainty will initially direct subordinates' effort toward strategy development and task learning, rather than the three direct goal mechanisms (i.e., effort, persistence and direction of attention) of goal setting. Effort directed toward strategy development and task learning, leads to delayed performance increases (Locke et al., 1981; Hirst, 1987; Locke and Latham, 1990; Bonner and Sprinkle, 2002). This view is consistent with Locke et al. (1981) who suggest that the cognitive factors (such as job-relevant information) are indirectly associated with performance. We propose that the availability of job-relevant information would enable subordinates to formulate effective strategies or plans, which will assist them to exert additional effort for budget goal attainment. We argue that the availability of job-relevant information would *initially* increase subordinates' budget goal acceptance.¹¹ Budget goal acceptance is subordinates' initial agreement with the budget goal (Locke, 1968; Locke and Latham, 1990). It implies moderated degree of acceptance of budget goal. Budget goal commitment, on the other hand, suggests subordinate's resistance to changing the budget goal at a later point in time. We further argue that as subordinates gather more job-relevant information which enables them to formulate effective strategies or plans for budget goal attainment, they will exert higher degree of commitment towards budget goal. In other words, a higher degree of commitment is viewed as the more inclusive concept in that it refers to one's attachment to or determination to achieve a budget goal. Taken together, we postulate that job-relevant information is positively associated with budget goal acceptance and budget goal commitment. This idea is expressed in the following hypotheses:

H10: There is a positive relationship between job-relevant information and budget goal acceptance.

H11: There is a positive relationship between job-relevant information and budget goal commitment.

2.6. The relationship between budget goal commitment and job performance

The last hypothesis is concerned with the relationship between budget goal commitment and job performance. As noted earlier, a primary prediction of goal-setting theory is that setting specific, difficult but attainable goals will be beneficial to performance compared to easy goals. Reviews of goal-setting studies showed that, in general, once individuals are committed to the budget goals, they will increase the effort required to achieve those goals. Individuals who are committed to spe-

¹⁰ See Locke et al. (1981) for a detailed discussion of the terms effort, persistence and direction.

¹¹ Budget goal acceptance is subordinates' initial agreement with the budget goal (Locke, 1968; Locke and Latham, 1990).

cific, difficult but attainable goals will try harder and persist longer, and will be more effective than less committed individuals (Locke and Latham, 1990). As a result, the more effort that is applied to goal attainment, the greater the chance of goal attainment, thus improving job performance. Thus, it is concluded that budget goal commitment should be positively associated with job performance. Numerous studies (see e.g., Earley and Kanfer, 1985; Erez et al., 1985; Erez, 1986; Erez and Arad, 1986; Locke et al., 1988; Locke and Latham, 1990; Wofford et al., 1992; Shields and Shields, 1998; Fisher et al., 2002; Wentzel, 2002) provided empirical support for this proposed relationship between budget goal commitment and job performance. Shields and Shields (1998) argued that the motivational role of budgetary participation enhances budget goal commitment, which in turn, improved performance. Fisher et al. (2002:32) argued that 'there should be a positive relation between commitment and subordinates performance'. Specifically, they found that subordinates in dyads that do reach agreement will be more committed to attaining their budget goals and perform at higher levels. In contrast, subordinates in dyads that do not reach agreement will be less committed to attaining their budget goals and perform at lower levels. Thus, the existing theoretical and empirical evidence suggest that the higher the level of budget goal commitment, the higher the level of subordinates' job performance. Stated formally, the following hypothesis is tested:

- H12:** There is a positive relationship between budget goal commitment and job performance.

3. Research method

3.1. Sampling selection

A survey methodology approach was used in this study. A total of 185 manufacturing firms located in Western Australia and New South Wales were randomly chosen from the 2001 *Who's Who of Australia* electronic database. The criterion for the sample inclusion was that all respondents are middle-level managers and they have budget responsibility. A total of 435 middle-level managers were identified from the 185 manufacturing firms for the project. Telephone contact was then made with each organisation to verify and confirm that the managers selected were still the incumbent of the position. From this confirmation, 355 middle-level managers were then selected as part of the final sample. Eighty managers were not included in the final sample for a number of reasons. First, 43 managers had since left their respective organisation; second, 16 managers had retired; and third, 21 managers had moved to other areas of their organisation.

Each participant was sent a covering letter, a questionnaire and a prepaid self-addressed envelope. The prepaid self-addressed envelope facilitates correspondence and ensures that the questionnaires are returned directly to one of the researchers. The questionnaires were pre-coded to identify those non-respondents so that follow-up letters can be sent. A total of 162 questionnaires were received, giving a response rate of 45.63%. Of the 162 questionnaires, 24 were excluded from the study for incomplete responses and three were considered as outliers.¹² This resulted in 135 usable responses for our data analysis.

The organisations have an average of 202 employees. Each manager, on average, had a responsibility for 30 employees. The average age of each participant was 43 years. The average length of time spent in the position was nearly five years and each manager had, on average, 12 years experience in his or her current area of responsibility. Most managers had been employed by their respective organisation for an average of 10 years.

3.2. Measurement of variables

Task exceptions and task analysability were evaluated by a nine-item, seven-point Likert-type scale developed by Withey et al. (1983). *Budgetary participation* was measured by a six-item, seven-point Likert-type scale developed by Milani (1975). *Job-relevant information* was measured by a three-item, seven-point Likert-type scale developed by Kren (1992). *Budget goal level* was measured by a five-item, five-point Likert-type scale developed by Kenis (1979). *Budget goal acceptance* was measured by a three-item, seven-point Likert-type scale developed originally by Leifer and McGannon (1986), which was subsequently validated by Renn et al. (1999). *Budget goal commitment* was measured by a two-item, five-point Likert-type scale developed by Tubbs (1993). *Job performance* was measured by a scale developed by Mahoney et al.

¹² In this study, three responses were considered as outliers. These three responses were from firms, which have employed relatively more employees than the rest of the firms. These three firms have employed 2,200, 10,000 and 15,000 employees, respectively. A univariate assessment of the values of the standardized scores reveals that two responses exceeded the recommended threshold standardised values (Z scores) range from ± 3 to ± 4 (Hair et al., 1998:65). The third response has a standardised value (Z score) of 1.18, but given that the firm has employed 2,200 employees and the average mean score for employees in other firms was 202, we treat this third response as an outlier. We believe these three responses are 'truly aberrant' and not representative of any observations of the population (see Hair et al., 1998:66). The structural equation modeling (SEM) analyses were repeated before the exclusion of the three outliers. The results revealed that there were no differences between SEM results based on 138 (before exclusion of the three responses) and those based on 135 responses (after the exclusion of the three responses). These results imply that the results are relatively robust to variations in the size (i.e. number of employees) of sample organisations.

Table 1
Descriptive statistics and Pearson correlation matrix (n = 135)

Variable	Actual (Theoretical) Range	Mean	S.D.	1	2	3	4	5	6	7	8
1. Task exceptions	1.80–7.00 (1.00–7.00)	4.640	1.183	1.000							
2. Task analysability	1.00–6.25 (1.00–7.00)	3.632	1.160	0.454**	1.000						
3. Budgetary participation	1.17–7.00 (1.00–7.00)	5.188	1.171	-0.249**	0.058	1.000					
4. Job-relevant Information	2.33–7.00 (1.00–7.00)	5.082	1.060	-0.030	0.320**	0.251**	1.000				
5. Budget goal level	1.80–4.80 (1.00–5.00)	3.693	0.620	-0.186*	-0.025	0.194*	0.007	1.000			
6. Budget goal acceptance	1.33–7.00 (1.00–7.00)	5.084	1.252	-0.216*	0.161	0.540**	0.268*	0.337**	1.000		
7. Budget goal commitment	1.00–5.00 (1.00–5.00)	4.385	0.775	-0.118	0.199**	0.491**	0.317**	0.347**	0.678**	1.000	
8. Job performance	4.00–7.00 (1.00–7.00)	5.733	0.725	0.007	0.142	0.263**	0.145	0.242**	0.187*	0.357**	1.000

*Significant at the 0.05 level (two-tailed); **Significant at the 0.01 level (two-tailed)

(1963, 1965). This instrument is a nine-item, seven-point Likert-type scale.¹³ Consistent with prior research (e.g., Kren, 1992; Chong and Chong, 2002), this study use the single overall job performance rating in our data analysis and hypothesis testing.

4. Results

Table 1 shows the descriptive statistics and Pearson correlation for the independent and dependent variables used in the study.¹⁴

4.1. Analytical technique

The structural equation modeling (SEM) technique was used to test our theoretical model (Figure 1) and hypotheses. The SEM technique is based on the *EQS* structural equation computer program (Bentler, 1995). *EQS* provides a variety of statistics to assess the validity of our model. Evaluation of the model fit was assessed by three fit indices: (1) the Bentler-Bonnet normed fit index (NFI), (2) the Bentler-Bonnet non-normed fit index (NNFI) and (3) the comparative fit index (CFI) (Bentler and Bonnet, 1980; Bollen and Long, 1992). Values greater than 0.90 are desirable for each fit index. *EQS* includes sophisticated model specification techniques such as the Lagrange Multiplier (LM) and Wald's test (Bentler, 1996). This study adopted a two-step approach recommended by Anderson and Gerbing (1988). First, the measurement model is evaluated by confirmatory factor analysis. Second, the structural model is used to test for the hypothesised relationships.

4.2. Measurement model

The measurement properties of the various scales used in our study were examined through estimation of a measurement model. Table 2 shows the maximum likelihood standardised loadings along with composite reliability and variance extracted estimates.

Three indices from the measurement model provide strong support for the convergent validity of our scales (i.e., task exceptions, task analysability, budgetary participation, job-relevant information, budget goal level, budget goal acceptance and budget goal commitment). First, the standardised loadings, which are indicators of the degree of association between a scale item and latent variable,

were each significant ($p < 0.05$). Second, the composite reliability, analogous to Cronbach alpha coefficient (Cronbach, 1951), was 0.79 or greater for each scale. These results suggest high internal consistency of the items comprising the various scales. Third, each of the *variance extracted estimates*, which represent the amount of variance captured by a construct relative to the variance due to random measurement error, exceeded the minimum level of 0.50 that was recommended by Fornell and Larcker (1981). Discriminant validity of the seven scales was assessed by comparing the variance extracted estimates with the squared correlations between the latent constructs (Fornell and Larcker, 1981). Table 3 reveals that the squared correlations were all less than the variance extracted estimates (see Table 2). Taken together, these results provided strong support for the discriminant validity of the seven scales.

4.3. Structural model and tests for hypotheses

Our structural model is analysed by aggregating only those items reflecting a common construct based on the measurement model analysis. Our structural model shows a very good fit to the data ($\chi^2 = 19.05$, $df = 13$, $p < 0.122$; NFI = 0.925, NNFI = 0.943, CFI = 0.973). To test our hypotheses, we rely on the standardised parameter estimates for our structural model, as shown in Figure 2.

The results revealed that there was a positive *but* not significant relationship between task exceptions and job-relevant information (standardised path coefficient = 0.088, n.s.). Thus, hypothesis H1(a) is not supported. As expected, the results indicated that there was a positive and statistically significant association between task exceptions and budgetary participation (standardised path coefficient = 0.323, $p < 0.05$). This result supports hypothesis H1(b). Consistent with our theoretical expectations, the standardised parameter estimates between: (1) task analysability and job-relevant information (standardised path coefficient = -0.355, $p < 0.05$) and (2) task analysability and budgetary participation (standardised path coefficient = -0.261, $p < 0.05$, were both negative and statistically significant. Thus, hypotheses H2(a) and H2(b) are supported.

The results presented in Figure 2 revealed that there was a positive and statistically significant relationship between budgetary participation and job-relevant information (standardised path coefficient = 0.168, $p < 0.05$), thereby supporting hypothesis H3.

Taken together, these results support the major premise of information-processing theory which proposes that the higher the level of task uncertainty, the greater the amount of job-relevant information that must be processed among decision-makers during task execution in order to

¹³ This instrument consists of a single overall performance rating with ratings on other eight dimensions of managerial activities. The eight dimensions of managerial activities are: planning, investigating, coordinating, evaluating, supervising, staffing, negotiating and representing (Mahoney et al., 1963, 1965).

¹⁴ We tested for non-response bias by the approach suggested by Oppenheim (1966). The results reveal that there were no statistically significant differences in the mean scores between the early and late responses.

Table 2
Results of confirmatory factor analysis

	<i>Construct and scale item</i>	<i>Standardised loading^a</i>	<i>Composite reliability</i>	<i>Variance extracted estimate</i>
Task exceptions	1.	0.72	0.85	0.55
	2.	0.49		
	3.	0.66		
	4.	0.87		
	5.	0.87		
Task analysability	1.	0.56	0.80	0.51
	2.	0.57		
	3.	0.85		
	4.	0.83		
Budgetary participation	1.	0.83	0.88	0.56
	2.	0.55		
	3.	0.59		
	4.	0.89		
	5.	0.85		
	6.	0.69		
Job-relevant information	1.	0.55	0.83	0.64
	2.	1.00		
	3.	0.78		
Budget goal level	1.	0.85	0.86	0.55
	2.	0.62		
	3.	0.97		
	4.	0.69		
	5.	0.50		
Budget goal acceptance	1.	0.81	0.79	0.74
	2.	0.98		
	3.	0.77		
Budget goal commitment	1.	0.86	0.92	0.86
	2.	0.99		

^aAll standardised loadings are significant at $p < 0.05$.

achieve a given level of performance (Galbraith, 1973, 1977; see also Romney and Steinbart, 2003).

In addition, the results indicated that: (1) there was a positive and statistically significant relationship between budgetary participation and budget goal level (standardised path coefficient = 0.194, $p < 0.05$), (2) there was a positive and statistically significant relationship between budgetary participation and budget goal acceptance (standardised path coefficient = 0.453, $p < 0.05$), and (3) there was a positive and statistically significant relationship between budgetary participation and budget goal commitment (standardised path coefficient =

0.153, $p < 0.05$). Thus, hypotheses H4, H5, and H6 are supported.

Support is also found for hypotheses H7, H8 and H9, as significant results were found for the relationships between: (1) budget goal level and budget goal acceptance (standardised path coefficient = 0.248, $p < 0.05$), (2) budget goal level and budget goal commitment (standardised path coefficient = 0.145, $p < 0.05$), and (3) budget goal acceptance and budget goal commitment (standardised path coefficient = 0.507, $p < 0.05$). Taken together, these results support the major premise of goal-setting theory (see Locke et al., 1981; Locke and Latham, 1990).

Table 3
Discriminant validity test

	<i>Correlation</i>	<i>Squared correlation</i>
TE-TA	0.454	0.206
TE-BP	-0.249	0.062
TE-JRI	-0.030	0.001
TE-BGL	-0.186	0.035
TE-BGA	-0.216	0.047
TE-BGC	-0.118	0.014
TA-BP	0.058	0.003
TA-JRI	0.320	0.102
TA-BGL	-0.025	0.001
TA-BGA	0.161	0.026
TA-BGC	0.199	0.040
BP-JRI	0.251	0.063
BP-BGL	0.194	0.038
BP-BGA	0.540	0.292
BP-BGC	0.491	0.241
JRI-BGL	0.007	0.001
JRI-BGA	0.268	0.072
JRI-BGC	0.317	0.100
BGL-BGA	0.337	0.114
BGL-BGC	0.347	0.120
BGA-BGC	0.678	0.460

TE = task exceptions; TA = task analysability; BP = budgetary participation; JRI = job-relevant information; BGL = budget goal level; BGA = budget goal acceptance; BGC = budget goal commitment.

The results presented in Figure 2 showed that there was a positive and statistically significant relationship between job-relevant information and budget goal acceptance (standardised path coefficient = 0.152, $p < 0.05$), thereby supporting hypothesis H10. Support was also found for hypothesis H11 which states that there was a positive and statistically significant relationship between job-relevant information and budget goal commitment (standardised path coefficient = 0.142, $p < 0.05$). Finally, the results indicated that there was a positive and statistically significant relationship between budget goal commitment and job performance (standardised path coefficient = 0.358, $p < 0.05$), thereby supporting hypothesis H12.

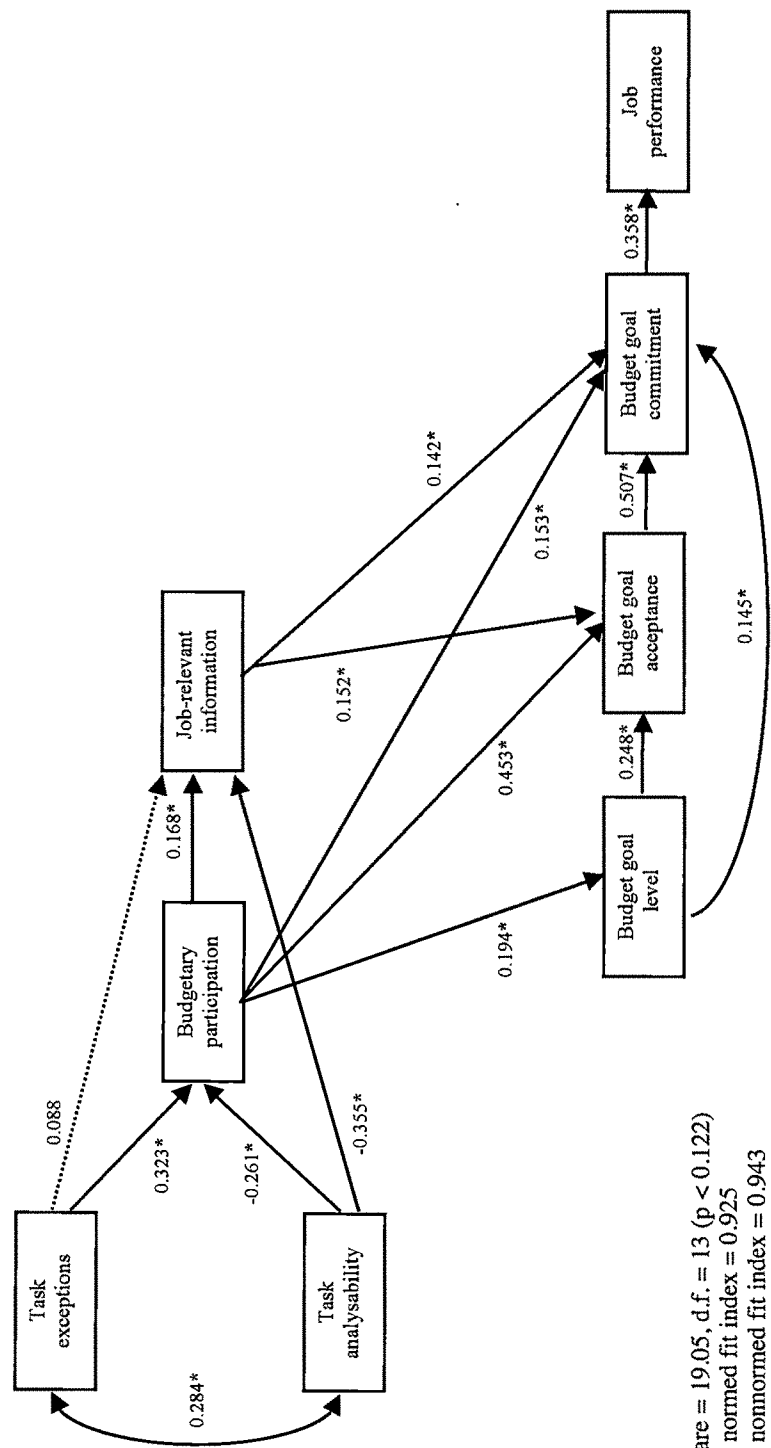
5. Conclusions and limitations

This study attempts to extend prior participative budgeting studies by incorporating a causal antecedent of participative budgeting (i.e., task uncertainty) and additional motivational variables (i.e., budget goal level, budget goal acceptance and budget goal commitment), relying on information-processing theory and a goal-setting theoretical framework. The results of our study suggest that task uncertainty is an important antecedent of budgetary participation. Specifically, our results concluded that when subordinates are faced with tasks which have a high number of exceptions and

a low level of analysability, their needs for participative budgeting increases. In other words, it is suggested that budgetary participation is caused by the degree of task exceptions and task analysability. More specifically, our results reveal that subordinates who face with tasks which have low level analysability will require additional job-relevant information. It is noteworthy that the results of our study are consistent with those of Shields and Shields (1998:60), who claimed that the existence of participative budgeting for sharing internal information is predicted to be associated with task uncertainty. Furthermore, the information needs of subordinates' under various degree of task uncertainty are also consistent with Galbraith (1973:4) who argued that '...the greater the task uncertainty, the greater the amount of information that must be processed among decision-makers during task execution in order to achieve a given level of performance.'

This study contributes to the existing literature by relying on information-processing theory and goal-setting theory to further our understanding of how participative budgeting really works, and the process by which it may happen. Specifically, the results of this study were consistent with our theoretical expectations. Our study confirmed that higher levels of budgetary participation led to increased job-relevant information under condition of high task uncertainty. This result supports the

Figure 2
Structural model with standardised path coefficients



Model chi-square = 19.05, d.f. = 13 ($p < 0.122$)
Bentler-Bonett normed fit index = 0.925
Bentler-Bonett nonnormed fit index = 0.943
Comparative fit index (CFI) = 0.973

*Path parameter estimates are significant at $p < 0.05$

information-processing theory and the cognitive role of budgetary participation, which is consistent with numerous prior empirical studies (e.g., Kren, 1992; Magner et al., 1996; Shields and Shields, 1998). These results provide additional evidence to support the proposition that the degree of task uncertainty causes increased information needs from subordinates, who in turn, increased their desire for the opportunity to participate.

The results of our study also confirmed that participation in setting the budget influences subordinates' budget goal level and motivations (i.e., budget goal acceptance and budget goal commitment), which ultimately enhances their job performance. The results were also consistent with our theoretical expectations. Specifically, our results confirmed that (1) high level of budgetary participation is related to higher budget goal level, and (2) high level of budgetary participation is related to higher budget goal acceptance and budget goal commitment. These results lend further empirical support to previous accounting studies (e.g., Kren and Liao, 1988; Wier, 1993). Taken together, these results provide support for the application of goal-setting theory and the motivational role of budgetary participation.

Most importantly, our study reveals that budgetary participation exists for three purposes: (1) cognitive, (2) planning and goal-setting, and (3) motivational, when there is task uncertainty. First, our results suggest that budgetary participation exists initially for *cognitive* purpose when there is task uncertainty. In other words, the demand for budgetary participation is caused by task uncertainty. The cognitive role of budgetary participation provides subordinates the opportunity to gather and share job-relevant information with their superiors and peers. In doing so, they can gain a better understanding of the task at hand.

Second, our results suggest that the reason for the existence of budgetary participation is for planning and goal-setting and for motivational purposes. Specifically, our results suggest that budgetary participation allows subordinates the opportunity

to set difficult but attainable budget goals. The opportunity to participate in planning and budget goal-setting resulted in an increase in their feelings of ego-involvement, sense of control and trust, which in turn, causes more acceptance of, and commitment to, their budget goals. It is found that highly committed subordinates will exert additional effort in an attempt to attain their budget goals, which ultimately enhances their job performance.

Several limitations of the study are noted. First, this study did not take into account other potential antecedents of budgetary participation such as information asymmetry (Shields and Young, 1993; Shields and Shields, 1998), perceived environmental uncertainty (Chong and Chong, 1997; Shields and Shields, 1998), personality variables such as locus of control (Mia, 1987; Chong and Eggleton, 2003), and strategy (Chong and Chong, 1997). In addition, this study did not consider other potential intervening variables such as budget-based incentive scheme (Shields and Young, 1993), organisational commitment (Nouri and Parker, 1998; Chong et al., 2006), and budget goal feedback (Locke and Latham, 1990).

Second, our study has examined only one aspect of the cognitive role of budgetary participation, namely to communicate job-relevant information. While it is possible that subordinates can withhold their private information in the budget-setting process, thereby creating budgetary slack, our study did not attempt to test such effect. Thus, future research may extend our study to investigate the impact of budgetary participation on budgetary slack within the goal-setting theory framework as proposed in our study. Third, the sample for our study was selected from the manufacturing industries. Therefore, generalisation of the results of our study to other industries such as financial services industries should be done cautiously. Further research involving the financial services industries would be worthwhile. Fourth, this study used a self-rating scale to measure job performance, which would lead to the problem associated with higher leniency error and lower variability error in the score (Prien and Liske, 1962; Thornton, 1968). Fifth, the use of Mahoney et al.'s (1963, 1965) performance scale is potentially a problem as it measures overall job (managerial) performance rather than budget-related performance. Furthermore, as all responses of this study came from the same manager to a set of survey items, the potential problem of common method biases may exist.¹⁵

Finally, our path (structural) model implies causality. However, the survey method employed in our study allows for examination of statistical associations at one point in time. The various statements about the direction of relationships proposed in this study can only be made in terms of the consistency of the results with the effects pro-

¹⁵ *Common Method Biases* are a problem as they are one of main sources of measurement error (Podsakoff et al., 2003). It has been argued that measurement error threatens the validity of the conclusions about the relationships between measures and has both a random and a systematic component (Bagozzi and Yi, 1991; Nunnally, 1978). For a critical review of the literature and recommended remedies of Common method biases, see Podsakoff et al. (2003). We conducted the *Harman's one-factor test* to see the extent to which common method variance was a concern. A factor analysis was conducted on all items measuring the eight variables. We obtained an eight-factor solution using the eigenvalue greater than one criterion. Our factor analysis result explained 66.02% of the variance. The first factor accounted for only 11.21% of the variance. Given that no single factor emerged explaining majority of the variance, we conclude that common method variance does not seem to be a significant threat to our results obtained.

posed in the theoretical discussions. The use of a different research method, such as longitudinal field study, would be appropriate to systematically investigate the theoretical causal relationships proposed in our study.

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Investigating the audit fee structure of local authorities in England and Wales

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Abstract—The purpose of this paper is to model and test the audit fee structure of local authorities in England and Wales, with particular interest in fees charged by the Big 4 and other private sector auditors. The Audit Commission, a national public body under Parliament, regulates local government audits in England and Wales. The Audit Commission sets audit standards, appoints the auditors, and establishes a formula to determine standard audit fees. Constrained by the standard audit fees, each local authority and its auditor negotiate the actual audit fees. The majority of audits are conducted by district auditors (public sector employees under the Audit Commission), although about 25% of local authorities are audited by one of six private auditors (including three of the Big 4). Regression results for financial year 2000/01 have high explanatory power and work well to explain fee differences. Model relationships are somewhat different from US counterparts (which is the context of most of the audit economics literature) and type of authority partially explains fee differences. OLS regression results indicate a Big 4 discount for local authority audits. Because of expected self-selection bias, the Heckman procedure is used to analyse the differences between private sector and public sector auditors, which indicates no selection bias for Big 4 firms, although bias is present for private firms as a whole and district auditors in some models. When fees are size-adjusted, results continue to show a Big 4 discount. The Big 4 discount was robust to other follow-up tests.

Key words: Audit fees; local government

1. Introduction

The objective of this paper is, for the first time, to model and test the audit fee structure of local authorities in England and Wales,¹ a setting in which dependence on central government may become less marked and governance more important, as one part of the greater accountability of public sector organisations in the 21st century. The Audit Commission, which is a national body under Parliament and the regulator of local authority audits in England and Wales,^{2,3} sets audit standards for all local authorities and appoints the auditors for all local authorities. Most audits are conducted by district auditors (DAs), who are in-house audit providers of the Audit commission, operationally independent of the commission and, in particular, of the commission's regulatory functions.

The Audit Commission has the choice of auditor for all authorities and can use private sector audi-

tors. For the financial year 2000/01, the private audit firms included three of the Big 4 and three smaller firms that have a specialty in local authorities. The local authority negotiates the audit fee, based in part on a standard fee schedule set by the commission.⁴

Because of the involvement of the Audit Commission in auditor choice, self-selection bias becomes an issue. Self-selection is an agent behaviour problem. The usual interpretation in auditing is that clients determine whether or not to use

¹ Northern Ireland has had a distinct form of local government and is not addressed in this paper. Local government in Scotland has similar features to local government in England and Wales, but there is a specific body for Scotland that regulates local government audits, which is also not addressed in this paper. Thus, our focus is with the local authorities in England and Wales, whose audits were regulated by one body, the Audit Commission.

² The Audit Commission for Local Authorities and the National Health Service in England and Wales, while it was created by law and is answerable to Parliament, is not part of central government. Central government does appoint the members of the Commission but the officers of the commission are not civil servants. The technical term in the UK for bodies such as this is 'non-departmental public body', meaning that while the government and Parliament have important roles to play in such bodies, the bodies are not part of any central government department. The Audit Commission does not allow charging for non-audit fees.

³ There were four public audit agencies in the UK at the time the empirical work in this paper was carried out. In addition to the Audit Commission, these were the National Audit Office, the Northern Ireland Audit Office, and Audit Scotland and the Accounts Commission for Scotland. The National Audit Office is responsible for central government audits. The remaining agencies are regional regulators of local authorities.

⁴ The standard fee is explained in Section 2.

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a Big 4 auditor. Because clients self-select the auditor, client observations are not randomly allocated across auditor categories.⁵ The commission selects the auditor on some non-random basis (e.g. geographic reasons). In addition, private audit firms may select out of the job. Thus, self-selection still exists and the result is a non-random assignment of auditors.

A Heckman two-stage procedure is used to try to control for the consequences of self-selection. Following the model introduced by Chaney et al. (2004) for commercial audits, this paper represents the first use of the Heckman approach for governmental audit fee models. A separate selection equation (first stage) is used to construct a selection-bias control factor, Λ , designed to reflect all unmeasured characteristics related to auditor choice. In the second stage, Λ is added as an additional independent variable in the fee model. A significant Λ indicates a self-selection bias, which can be further analysed.

The standard audit fee is set by the Audit Commission, based on the type of local authority.⁵ However, the actual financial audit fee, the amount paid directly for the financial audit, is negotiated between the auditor and the local authority. The total audit fee, which includes the fees for all other audit-related charges, is expected to be within 30% of the standard audit fee (Audit Commission, 2000). The commission recognises that fees may be outside this range under some circumstances, but seeks explanations when this occurs.

Although the economic relationships for audits of UK local authorities have not previously been tested, the audit economics literature associated with US local governments is extensive.⁶ However, the regulatory environments associated with UK local authority audits differ from the US context, most markedly in that US cities and counties have considerable autonomy in operations and the audit process. Consequently, audit relationships may be substantially different and our understanding of important regulatory and efficiency relationships may be incomplete. In the UK, we have now seen research (for example, Clatworthy et al., 2002; Basioudis and Ellwood, 2005) on that other area of the Audit Commission's ambit, namely the National Health Service (NHS), but local authorities are fundamentally different bodies from those in the NHS because of the central role played by directly-elected local politicians in local government.

This paper focuses on: (1) actual financial audit fees and total audit fees charged for financial year

2000/01, (2) the relative fee premium (or discount) by comparing the total audit fee divided by the standard audit fee, and (3) evaluating actual financial audit fees, total audit fees and fee premium (or discount) by auditor type. Actual financial audit fees are analysed because they are closely related to US audit fees. The total audit fees are examined since they are used by the Audit Commission to evaluate actual financial audit fees to standard fees. The fee premium (or discount) is the difference from the regulatory benchmark and functions as a separate test of relative fees. If local authority audits in England and Wales followed the results found in US studies, Big 4 firms would charge a higher premium than either district auditors or smaller private firms. However, univariate and multivariate results show a net fee discount for Big 4 firms.

This paper contributes to the literature in three ways. (1) A model of audit fees in local authorities in England and Wales is introduced. While this model is of interest in its own right, it has added interest given that the context of much of the audit economics literature (based in the US) is different, as is the context of the parallel work in the UK on the NHS. The environment associated with the Audit Commission is described in detail. (2) We focus on Big 4 audit fees, because a fee discount is found relative to district auditors. The fee discount holds up in most robustness checks and Big 4 premiums are not found in any of our models. (3) Two particular self-selection issues are examined arising from the facts that the Audit Commission selects the auditor and that, while district auditors must conduct audits to which they are assigned by the commission, the private sector auditors need not do so.

The remainder of the paper is divided into the following sections. The next section describes the audit process associated with local authorities in England and Wales, emphasising how the audit fee is determined. Section 3 reviews model development, specifically how to explain the audit fee structure. Section 4 describes the sample of local authorities in England and Wales used for empirical analysis and describes the statistical methods used. Section 5 reviews the empirical results. Section 6 includes sensitivity checks. The last section concludes the paper.

2. Local authorities and audit fees

The Audit Commission database has 409 multi-function local authorities in England and Wales (at 1 April 2000), each of which is the responsibility of locally elected politicians. The law requires an external auditor to be appointed for each local authority and determines the auditor's responsibilities and powers (Audit Commission Act 1998, Local Government Act 1999). The Audit Commission

⁵ A fuller explanation is given in Section 2.

⁶ See, for example, Baber et al. (1987), Rubin (1988), Copley et al. (1994), Ward et al. (1994), Copley et al. (1995), Deis and Giroux (1996), Elder et al. (1999), and McLelland and Giroux (2000).

was created by law in 1983 and its members are appointed by central government (Giroux et al., 2002:12–14). The commission has the statutory role to regulate local authority audits, a role that explicitly includes setting the standards to which the auditors are required to work and monitoring and evaluating the auditors' work against those standards. These requirements include compliance with professional auditing standards.

In addition to this regulatory role, the commission appoints the external auditor to each of the 409 local authorities. There are two pools of external auditors from which the Audit Commission chooses. The first pool comprises in-house auditors, who are known as district auditors, and are public officials. The second pool comprises private sector auditors including, but not restricted to, the Big 4 firms. Traditionally, about 70% of the auditors appointed are district auditors, the balance being private sector auditors. For the financial year 2000/01, district auditors conducted 303 audits (74.1%), while the private sector audited 106 (25.9%) local authorities.

For the financial year 2000/01, the Audit Commission introduced a uniform method for setting audit fees for all local authorities.⁷ This method requires that the outputs of each audit are set by the commission and agreed with each auditor. The actual audit fee is determined by each authority and each authority's auditor but is circumscribed by a standard fee determined by the commission. The standard fee represents the judgment of the commission of the expected audit costs, based on authority type and relative spending levels, adjusted for cost-of-living differences. The new approach was designed 'to encourage auditor innovation and efficiency improvements' (Audit Commission, 2000:2).

Auditors conduct their work in accordance with the requirements of the *Code of Audit Practice*, published by the Audit Commission and approved by Parliament. Auditors must also take account of any supplementary guidance or instructions issued by the commission.

The commission requires the following outputs

from each financial audit:

- A certificate that the audit of the accounts has been completed in accordance with statutory requirements;
- An opinion on the financial statements (and other opinions, as required);
- A statutory report on the audit of what is known as a 'best value performance plan' (when appropriate);
- A report dealing with matters that the auditor considers to be in the public interest (which is required by law in exceptional cases);
- Oral and/or written reports or memoranda to officers of the local authority and, when appropriate, politicians of the local authority on the results of, or matters arising from, specific aspects of auditors' work (when appropriate);
- An annual audit letter addressed to the audited body.

Auditors perform other audit-related procedures for additional fees, including value for money work, grant claims from central government and various statutory reports. The most common audit-related work includes:

- Programmed reviews of the financial aspects of the audited body's corporate governance arrangements;
- Programmed reviews of aspects of performance management, including the audited body's arrangements to secure economy, efficiency and effectiveness in its use of resources, which may include national 'value for money' studies, follow-up work and local 'value for money' studies;⁸
- The arrangements for collecting, recording and publishing performance indicators (when applicable);
- The audit of 'best value' performance plans.

All financial years are 1 April to 31 March, and the standard fee is set for work to be done in the period from 1 November within the financial year being audited to 31 October in the following year. Because some of this work relates to periods other than the financial year, these other periods are also detailed. In setting this scale, the commission explicitly justifies the effects on audit fees paid by local authorities, fees received by the commission's own staff, fees received by private sector auditors, and the commission's own finances, typically in terms of percentage changes from previous years and comparisons with percentage changes in associated professional services.

The standard fee is a function of total annual gross expenditure of each local authority (but includes turnover on the fund that deals with public housing and on the pension fund, when applicable). It is derived from the local authority's con-

⁷ The new system had gradually been used for some authorities since 1995/96 but was only applied to all in 2000/01. Under the former system, the audit fee was determined by the commission in setting hourly rates, differentiated according to the type of local authority being audited. Total audit fees paid were, therefore, the product of actual audit hours and the relevant hourly rates.

⁸ 'Value for Money' is the comprehensive term to refer both to economy and efficiency audits and to effectiveness audits. Auditors have a duty to do such work for their clients (known as 'local value for money studies'). The Audit Commission also has the duty to carry out such work, not for each local authority taken separately, but for local governments as a whole (known as 'national value for money studies'); auditors also contribute to these national value for money studies.

solidated income and expenditure account for the financial year being audited (Audit Commission, 2000). The standard fee function (STANDARD FEE) is:

$$\text{STANDARD FEE} = [(\text{total annual gross expenditure} * x\%) + \text{£}y]$$

Type of local authority	x%	£y
London boroughs	0.0350	110,000
Metropolitan councils – outside London	0.0320	95,000
County councils	0.0175	95,000
Unitary authorities	0.0410	95,000
District councils	0.0875	35,000

To take a specific example, the city of Birmingham, which is the biggest authority in our sample, had total annual gross expenditures of £1,786.1m for 2000/01. Birmingham is a metropolitan council; therefore, the calculation of STANDARD FEE is: $[(£1,786.1\text{m} \times 0.00032) + \text{£}95,000] = \text{£}666,552$. TOTAL FEE for Birmingham was £632,000 (BASE FEE of £573,000 + £59,000 in audit-related fees), or £34,552 below the standard fee. Birmingham was audited by a district auditor. Each local authority is expected to set its audit fee within $\pm 30\%$ of the relevant STANDARD FEE. In other words, the total audit fees charged to the local authority can vary from 70% to 130% of STANDARD FEE (with adjustments for specified areas). Auditors can charge an additional 6.5% of total fees in 'specified areas' based on higher perceived costs. These specified areas are in the south-east of England, where the cost of living is higher.⁹

3. Model development

The purpose of this paper is to evaluate the financial audit fees (BASE FEE) of local authorities in England and Wales, TOTAL FEE, and the relative fee premium or discount (FEE PREM), measured as TOTAL FEE / STANDARD FEE. TOTAL FEE includes all audit-related fees charged by the auditor. BASE FEE is associated with the six required financial audit outputs previously listed. TOTAL FEE includes the six required outputs plus additional sanctioned procedures such as 'value for money' (also previously listed). If TOTAL FEE is equal to the standard fee, FEE PREM=1. If the local authority pays a premium over the standard fee, FEE PREM>1; FEE PREM<1 if the local au-

thority negotiated an actual fee lower than the standard fee. FEE PREM should be within 30% of the standard fee. The Audit Commission investigates exceptions, which often can be justified by the particular local authority but which also can influence the local authority in setting future audit fees.

Both univariate and multivariate tests will be used to analyse FEE, TOTAL FEE, and FEE PREM. BASE FEE and TOTAL FEE are logged for correlation and multivariate analysis, due to skewness.

These three measures of audit fees are used because of the different perspective of the England and Wales local governmental audit market from that in the US. BASE FEE seems roughly consistent with audit fee calculations of US studies. However, the TOTAL FEE construct is relatively more important according to the Audit Commission. This measure captured all audit-related charges and this is the measure the commission uses to compare to standard fees.

3.1. Fee model constructs

Six constructs are used to capture audit fee characteristics: (1) auditor type, (2) auditor expertise, (3) client size, (4) measures of client complexity, including demographic characteristics, (5) audit risk factors and (6) local authority type. These are discussed below, along with the empirical surrogates used for analysis. The model is summarised in Table 1.

Of particular interest is the auditor category: district auditor (DA), one of the Big 4 accounting firms (BIG 4), or a non-Big 4 private firm with a local governmental specialty (SMALL). Dummy variables are used to identify BIG 4 and SMALL. The remaining variables serve as control measures.

In many US audit fee studies of commercial clients, a premium for a Big 4 auditor was found, usually associated with the reputation effect (e.g. Copley et al., 1995). As summarised by Ireland and Lennox (2002), Big N (Big 8 down to Big 4, depending on the time of the studies) fee premiums were found in Australia, New Zealand, UK, Hong Kong, Singapore and India. However, no fee premiums were found in Malaysia, Norway, the Netherlands and South Africa.

Limited literature also suggests that private sector auditors (Big 4 and smaller firms) charge higher fees for local governmental audits (e.g. Rubin 1992). However, in the England and Wales local government context, it has been suggested that there is a district auditor premium. This reflects the fact that DA is motivated by gross turnover, whereas the firms are motivated by profit. That is, DAs are likely to perform more audited-related procedures than BIG 4 or SMALL. So an audited body that has a DA as its auditor pays a marginally higher fee but gets more work for it.¹⁰ Basioudis

⁹ The 'specified areas', for which there is the 6.5% premium, are local authorities within the counties of Kent, Surrey, Sussex, Hampshire, Isle of Wight, Berkshire, Oxfordshire, Buckinghamshire, Bedfordshire, Hertfordshire, Cambridgeshire and Essex.

¹⁰ This insight is provided by staff members of the Audit Commission.

Table 1
The audit fee model

Construct / Empirical surrogate	BASE FEE	TOTAL FEE	FEE PREM
Auditor type*			
Small private firm (SMALL)	?	?	?
Big 4 (BIG 4)	?	?	?
Auditor expertise			
Number of local authority clients (CLIENTS)	?	?	?
Client size			
Log of population (LPOP)	+	+	+
Demographic characteristics			
Log of population density (LPOPDEN)	+	+	+
Log of average income (LAVGINC)	?	?	?
Audit/credit risk			
Financial viability (FV)	—	—	—
Surplus/deficit (SURDEF)	—	—	—
Debt per 1,000 population (DEBT)	+	+	+
Authority type			
County council	?	?	?
District council	?	?	?
Unitary authority	?	?	?
London borough	?	?	?

*Note: There are three audit types: district auditor (DA), one of the Big 4 accounting firms (BIG 4), or a non-Big 4 private firm with a local governmental specialty (SMALL). Dummy variables are used to identify BIG 4 and SMALL (relative to DA).

and Ellwood (2005) tested the audit fee structure of 369 NHS trusts. They predicted a fee premium for Big 4 firms. Regression models indicated significant Big 4 fee premiums; however, when individual firms were tested only one firm recorded a significant premium. No Big 4 premium existed when total fees (including non-audit fees) was the dependent variable. Clatworthy et al. (2002) also tested audit fees for National Health Service trusts. Neither Big 6 nor mid-tier private firms were significant. Consequently, there is evidence from a similar audit market to conclude that a Big 4 premium is not likely.

Following Mayhew and Wilkins (2003), the number of authority clients (CLIENTS) is used as a measure of industry market share. Deis and Giroux (1996) use the number of local governmental clients as a measure of reputation. Mayhew and Wilkins (2003) view auditor specialisation as measured by market share as a differentiation strategy, providing economies of scale and industry-specific expertise. Higher audit quality, higher client satisfaction and lower audit costs are expected with this differentiation strategy. Mayhew and Wilkins (2003) found a fee premium when specific auditors dominate market share, but a relative fee discount for audit industry specialisation but not domination. The auditor can (1) pass on the

lower costs due to economies of scale through lower pricing or (2) retain the cost savings and charge a premium price. Therefore, no sign is predicted.

Client size should be associated with audit complexity. Population is used to capture relative size. The log of population (LPOP) is used in the multivariate analysis to control for skewness. Following Bamber et al. (1993) and McLelland and Giroux (2000), a positive sign is expected.

Two demographic measures of client complexity are population density and average income. Population density (POPDEN) is used to capture relative 'urbaness' and financial complexity. The Gonzales and Mehay (1985) model used population density to control for economies of density, as public spending may relate to land area rather than population size (Giroux and Shields, 1993). Most of the major urban areas have only one local authority; most of the rural areas have two (a county council plus one other geographically smaller local authority) so that the public services provided are divided between the two. Therefore, most local authorities in major urban areas provide more services than local authorities do in rural areas. Also, certain public services are associated with urban areas, such as transport. A positive coefficient is predicted. Average income (AVGINC) cap-

tures the relative wealth of a local authority. Income levels are usually associated with greater financial health in US studies (e.g. Deis and Giroux, 1996). However, only limited revenues are generated from the local property tax base for authorities in England and Wales. Most revenues come from central government and these public monies tend to be 'dependence-based', that is, relatively more funding is given to poorer authorities. No sign is predicted for AVGINC. The logs of population density (LPOPDEN) and average income (LAVGINC) are used for multivariate analysis to control for skewness.

The audit firms may focus on audit and credit risk to determine fees, a possible factor for audit pricing differences. However, risk measures may differ from US counterparts because of institutional and other differences. Two variables are used as potential empirical surrogates for audit risk in this environment: financial viability (FV) (Giroux and McLelland, 2003) and surplus/deficit (SURDEF) (McLelland and Giroux, 2000). Debt per capita (DEBT) is used to proxy for credit risk (Baber et al., 1987; Ward et al., 1994; Copley et al., 1995).

Financial viability is defined as general fund balance / net revenue expenditures and is used as an indicator of relative equity. A low measure can signal fiscal stress, increasing audit risk. A negative sign is expected. On average, authorities have a net equity position (FV) of 0.3% of net revenue expenditures (CIPFA, 2001). Surplus/deficit (SURDEF) is the general fund surplus or deficit, stated in pounds (£). Running a deficit should indicate increasing financial risk. However, only 91 authorities (22.2%) had a surplus in 2001 (CIPFA, 2001). A negative sign is predicted; however, since authorities can budget for a deficit only if a positive fund balance exists to cover the deficit, this variable may be less important than FV.

Debt levels are measured as the total borrowing of the authorities including bank overdrafts. DEBT is scaled by population per thousand. The most common debt variable measured in US studies is municipal debt. Since the interest is 'tax-free' to lenders, the interest rates are lower to municipal borrowers and debt levels tend to be relatively large. There is no 'tax benefit' to local authorities in England and Wales. Most debt comes from bank lending and borrowing from the Public Works Loan Board, a central government agency. Despite the institutional differences, the interpretation is the same. Higher debt levels are associated with greater credit risk and a positive sign is expected.

Local authorities are multi-function entities administered by politicians elected locally, with limited power to tax and borrow. There are five categories of authorities in this analysis: county councils, district councils, London boroughs, unitary authorities, and metropolitan councils.

Because each category has unique characteristics, dummy variables are used to capture locally-specific information. In 1974 there was a major reorganisation of local authorities and piecemeal changes since then.

London boroughs and metropolitan councils are located in major urban areas, each providing all the major services associated with local authorities in England and Wales. Each unitary authority also provides all major services. While every unitary authority may not necessarily be in a major urban area, each will have a significant town at its heart. London boroughs, metropolitan councils and unitary authorities tend to have larger populations and higher population densities.

County councils and district councils conduct the major local authority services for a given geographical area. Within any given county area, there will be one county council and many contiguous district councils. The county council will typically provide services such as education for the whole area (and therefore across the jurisdictions of many district councils), while services such as refuse collection are provided separately by each district council. County councils are often rural and usually have low population densities; district councils usually have smaller populations, but population densities can vary.

3.2. Robustness checks

Self-selection bias is a major concern associated with audit fee models, especially when Big 4 auditors are present. Selection bias 'refers to the bias in the estimates obtained by following the usual procedures of estimation that ignore the non-randomness of the samples' (Maddala, 1991: 797). A Big 4 audit fee premium is a typical empirical finding and associated with a brand name auditor providing a higher quality audit (DeAngelo, 1981; Copley et al., 1995). Each client determines whether or not to use a Big 4 auditor, resulting in a self-selection problem. As stated by Chaney et al. (2004: 53): '[I]t is probable that firms self-select into Big 5 and non-Big 5 auditees based on firm characteristics, private information, and other unobservable characteristics.' OLS models not correcting for self-selection produce biased and inconsistent coefficients. The error term in the OLS model will be systematically associated with type of auditor. The Heckman procedure is used to correct for self-selection.

James Heckman introduced his correction for self-selection bias in the 1970s to deal with individual decisions about labour-force participation and hours worked (e.g. Heckman, 1979 or Heckman and Smith, 1995). It has been used in accounting and recently in the audit fee literature to control for selection of Big N firms. Ireland and Lennox (2002) tested UK audit fees, using

Heckman to compare Big 5 to non-Big 5 firms. A selection bias was discovered based on a significant inverse Mills ratio (Λ), which translated into a Big 5 audit fee premium of 53.4% (compared to 19.2% without measuring selection bias).

Copley and Douthett (2002) used Heckman's simultaneous equation two-step estimation to analyse auditor choice (including audit fees) associated with US initial public offerings. Client firms initiating IPOs were more likely to select a Big N auditor if they had higher risk characteristics. Chaney et al. (2004) found a Big 5 audit premium on a sample of UK private firms. They found both intercept and slope coefficients significant, indicating that Big 5 firms have different fee structures than non-Big 5 firms. McMeeking et al. (2006) looked at why Big N firms earned a fee premium for big UK firms, over a long time period (1985–2002). They used Heckman's as part of their sensitivity analysis, which indicated that larger firms with more overseas subsidiaries or more non-audit services were more likely to hire Big N firms. Λ was significant only for large client firms. Omer et al. (2006) considered auditor-provided tax services for 2002–2003, using an abnormal audit fee more to determine unexpected audit fees. Disclosure of tax fees was voluntary and Heckman's was used to control for the voluntary nature of tax fee disclosure (i.e., disclosure of tax fee was self-selected in this time period). The extant literature using Heckman's indicates a Big N fee premium larger than expected based on OLS regression. However, our analysis focuses on a unique environment and a different self-selection bias.

The auditor selection process for UK local authorities is different relative to the extant US literature, with the Audit Commission making the final auditor choices. Self-selection is still an econometric problem but is based on unobserved characteristics of the Audit Commission and potential auditors. A key point is that the private auditors can decline audits, while district auditors cannot. An objective of the Audit Commission is to have three potential auditors for each authority; i.e., the regional district auditor's office and two private firms (Audit Commission, undated). Consequently, the selection incentives differ from other environments.

Since the Audit Commission assigns the auditor, there are two possible biases. Whether the commission picks a DA presumably depends on various factors, but it may select Big 4 and other private auditors on a non-random basis, such as for

geographic reasons. This is the first potential bias. The private audit firms may select out of the audit job, also resulting in a non-random assignment of auditors.

It is not clear that a fee premium or discount is expected for Big 4 auditors of local authorities. However, certain Big 4 characteristics are expected. Big 4 firms base their product differentiation strategies on personnel training, key technological advantages, and other efficiency-related characteristics (Mayhew and Wilkins, 2003). Following Chaney et al. (2004), it is hypothesised that Big 4 firms have higher fixed costs related to technology and other efficiencies, but potentially lower variable costs. Chaney et al. (2004) expect that this should result in a larger intercept for Big 4 firms, while the slope coefficient should be smaller.

Client size is the primary driver for audit fees. Consequently, a size variable is included as an independent variable to control for size; we use local authority population in this case. Despite this variable, size may still be a biasing factor in the model. For example, in most audit fee studies Big 4 auditors are associated with larger clients. That is true in this case. The average authority size for BIG 4 is 251,245, compared to 180,954 for district auditors and 136,544 for small firms.

Because of the systematic differences in size, the error term will be directly related to size of the clients, which violates the OLS assumption of homoskedasticity. To correct for this violation, another set of regressions was run with fees scaled by population, which provides more reliable t-statistics. The remaining independent variables are the same. An alternative test uses rank transformations for fees and population.

4. Sample and method

The sample is based on the data files of the Audit Commission, which includes 409 multi-function local authorities.¹¹ Information on audit fees and related data comes from the commission files. Financial information on the local authorities comes from the Chartered Institute of Public Finance and Accountancy (CIPFA, 2001). Income data is taken from Inland Revenue Statistics (Reade, 2000).

The initial testing of the audit fee models uses OLS regression. The dependent variables are (1) FEE, (2) TOTAL FEE and (3) FEE PREM. The major independent variables are dummy variables for SMALL and BIG 4, to discern if these are significantly different from fees charged by the district auditors. Diagnostic tests include tests for normality of residuals, extreme values, multicollinearity and homoskedasticity. Extreme values were detected in various models and deleted from the sample for multivariable analysis. Extensive heteroskedasticity was discovered and White's

¹¹ This sample of 409 authorities includes the Corporation of London, which is a business district officially listed with a population of a few thousand. This observation was dropped from the empirical analysis.

correction was used to restate t-values in the regression models.

To correct for self-selection bias, the Heckman (1979) two-stage procedure is used for the TOTAL FEE model. In the first stage, a probit model is used as an auditor choice model, using the dummy variable BIG 4.¹² The independent variables proxy for client attributes associated with the selection process. The variables are: LPOP, LPOPDEN, LAVGINC, county council, district council, unitary authority, London borough, and CLIENTS. First stage results are presented in Table 6. The predicted values from the probit models are transformed into the inverse Mills Ratios (Lambdas), probability functions of the selection decision. Lambda is the self-selection variable used in stage two.

The second stage is OLS regression, split by BIG 4/district auditor (and private/district auditor), with and without Lambda. With the exception of Lambda, the model is the same as described above. The coefficients for the Lambdas are the estimates from the residuals of the auditor choice models. (See Chaney et al., 2004: 54–58 for a more detailed discussion of the Heckman two-stage procedure.) Second stage results are summarised for the BIG 4 model using TOTAL FEE.

OLS results were rerun where the dependent variables were (1) log of FEE per 1,000 population and (2) log of TOTAL FEE per 1,000 population. Interestingly, there were no diagnostic problems with these models.

5. Results

5.1. Univariate analysis

Table 2 summarises means and distribution characteristics (standard deviation, minimum and maximum) of the variables of interest. Base audit fee averaged £118,000, or £759 per 1,000 population. The total fee (which included non-recurring charges for statutory reports, fees for best value plans, and audits of grant claims from the central government) was £146,232 or about 24% above the base audit fee. The average standard fee set by the Audit Commission was £126,794, 17.8% below the total fee, on average. The relative discounted or premium fee ranged from 71.9% to 253.5% (with 100% meaning total fee was identical to the standard fee).

Fifty-one authorities (12.5%) charged fees less

than standard, although all were above the 70% expected minimum. The remaining 357 authorities (87.5%) charged a premium, with 89 (21.8%) above the 130% expected maximum. Fourteen of these extreme premium firms had fees above 150%; that is, over 50% above the standard fees. The commission investigates the authorities paying more than the 30% premium. The most common explanations for higher fees were (1) high audit risk and/or (2) the statistical calculations on which the standard fees were based were inappropriate. In most cases, the commission was satisfied with the explanation. For example, Watford District Council had the highest fee premium at 153.5% above the standard fee. The explanation was that this was a high-risk audit and a disclaimer audit opinion issued, which was accepted by the Audit Commission. Also, 25.1% of Watford's total fees was for other audit services, above the 19.2% average for the sample. Watford was one of the extreme values deleted from the regression analysis.

Population averaged 192,000, with a substantial range of 25,000 to 3.3 million. Mean population density was 12.6 persons per hectare, again with a substantial range (0.2–137.1). Because of the skewness of these two variables, they were logged for the multivariate analysis.

Financial viability (FV) measures the relative equity position to spending (fund balance to total expenditures). A higher FV suggests lower audit risk. On average, FV was slightly positive (0.3%), but ranged from a negative 12.9% to 4.5%. The average authority has a small deficit of £1,223, but with a substantial range of £26,466 deficit to £7,203 surplus. Deficits were found in 287 (70.2%). This is a potential indicator of audit risk for the majority of authorities.

Panel B of Table 2 describes fee data by auditor category. Big 4 audits were more expensive on average at £132,306, almost 15% above the average district auditor fee. However, the average fee per 1,000 was the lowest for the Big 4 at £690 per 1,000 population. Both standard fees and total fees had the same relationships by auditor type. The average fee premium was the lowest for BIG 4 audits at 112.6% (that is, the Big 4 audit premium was 12.6% above standard fees on average). The average fee premium for DA was 119.1% (19.1% above standard). A t-test was run (Satterthwaite method for unequal variances) comparing DA with private sector auditors. District audit fees were significantly higher only for fee per thousand and fee premium.

Local authorities are analysed in Table 3, cross-classified by auditor category in Panel A and by means for the continuous independent variables in Panel B. The majority of the local authorities are district councils (58.3%), but these also have the smallest populations, averaging less than 100,000.

¹² Two models are run. The first comparison is Big 4 to district auditors and the second, private to district auditors. In the first model, SMALL firms are deleted. However, an important consideration is the distinction of district auditors to all private firms. Consequently, this second approach also is used. Heckman also was run for the BASE FEE and FEE PREM models. However, no independent variables were significant including Lambda in the FEE PREM model. Only the TOTAL FEE using BIG 4 is tabulated.

Table 2
Descriptive analysis

Panel A: Continuous variables used for analysis

<i>Variable*</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>Maximum</i>
Base audit fee	£118,003	£90,383	£30,000	£623,774
Fee per thousand	£758.6	£410.1	£87.2	£3403.0
Total fee	£146,232	£98,141	£45,000	£679,927
Standard fee	£126,794	£85,585	£42,359	£666,524
Fee premium	117.8%	.183	71.9%	253.5%
Population	192,015	246,618	25,000	3,332,800
Population density	12.58	19.05	0.20	137.10
Average income	£20,320	£5,767	£12,900	£86,500
Number of clients	58.6	24.1	4	85
Financial viability	0.3%	0.005	-0.129	0.045
Surplus/deficit	£(1,223)	£3,121	£(26,466)	£7,203
Debt per thousand	£128.7	£140.8	0	£982.7

Panel B: Audit Fees by auditor category

<i>Variable</i>	<i>District auditor</i>	<i>Small private auditor</i>	<i>Big 4 auditor</i>	<i>T-value</i>
Base fee	£116,238	£93,563	£132,306	-0.71
Fee per thousand	778	746	690	1.67**
Total fee	£145,833	£110,554	£159,435	-0.20
Standard fee	£124,500	£97,232	£144,824	-0.98
Fee premium	119.1%	120.1%	112.6%	2.36**

* Actual audit fee, fee per 1,000 population, total fee, standard fee, and average income are stated in £, population density is persons per hectare, number of clients is number of authority audit clients by auditor, financial viability is the ratio of general fund balance to total expenditures, surplus/deficit is general fund revenues minus expenditures stated in £, and debt per capita is total debt per 1,000 population stated in £.

** Significant at 0.05 (t-test using the Satterthwaite method, comparing district auditors to private auditors).

There are only 34 county councils (8.3%), but these have the largest populations on average. Big 4 firms audited a much larger percentage of county councils (38%), London boroughs (31%), and metropolitan councils (25%). These categories tend to have larger and wealthier populations.

Population density varied from 2.6 for county councils to 60.2 for London boroughs. Only district councils reported relatively large financial viability, at 0.5% of net revenue expenditures. All authority types reported an average general fund deficit, over £4,000 at Metropolitan Councils. DEBT also varied by category, from £71 at to £338 at London Boroughs.

Table 4 presents a Pearson's correlation matrix for the variables in the regression models. As expected, BASE FEE and TOTAL FEE are both significantly correlated with POP and POPDEN, but FEE PREM is negatively correlated with POP. Smaller authorities tend to pay larger fee premium percentages. Neither SMALL nor BIG 4 is correlated with BASE FEE or TOTAL FEE, although BIG 4 is negatively correlated with FEE PREM. All authority types are correlated (either positively or negatively) with both BASE FEE and TOTAL

FEE. Both BASE FEE and TOTAL FEE are positively correlated with CLIENTS and DEBT and negatively correlated with financial viability and surplus/deficit. FEE PREM is correlated (either positively or negatively) with two of the authority types. FEE PREM also is positively correlated with financial viability and surplus/deficit. Generally, the correlation results were similar between BASE FEE and TOTAL FEE, but quite different for FEE PREM.¹³ Across the independent variables, there are some significant correlations; however, variance inflation factors used in the regression models are all below 10, a common rule of thumb to indicate no multicollinearity problems (Gujarati, 1995).

5.2. OLS regression analysis

Regression results are summarised in Table 5. Separate OLS results are presented for BASE FEE, TOTAL FEE and FEE PREM. Observations

¹³ Since STANDARD FEE is a linear function of total expenditures, it is likely that actual audit fees are relatively lower as size increases. That is, audit fees are not expected to rise as fast as total expenditures. The result is consistent with opposite signs for FEE PREM.

Table 3
The types of local authorities in England and Wales

Panel A: Sample frequency by auditor category

<i>Authority type</i>	<i>District auditor</i>	<i>Small private auditor</i>	<i>Big four auditor</i>	<i>Total</i>
County council	20 (58.8%)	1 (2.9%)	13 (38.2%)	34 (8.3%)
District council	183 (76.9%)	18 (7.6%)	37 (15.6%)	238 (58.3%)
London borough	22 (68.8%)	0 (0)	10 (31.3%)	32 (7.8%)
Metropolitan council	25 (69.4%)	2 (5.6%)	9 (25.0%)	36 (8.8%)
Unitary authority	53 (77.9%)	4 (5.9%)	11 (16.2%)	68 (16.7%)
Total	303 (74.3%)	25 (6.1%)	80 (19.6%)	408* (100%)

*Chi-square for auditor type by authority type = 16.48, significant at 0.05

Panel B: Means for continuous independent variables by authority type

<i>Authority type</i>	<i>POP</i>	<i>POP DEN</i>	<i>AVG INC</i>	<i>FV</i>	<i>SUR (DEF)</i>	<i>DEBT</i>
County council	677,174	2.56	20,476	0.00001	£(964)	£133.0
District council	95,538	6.19	20,473	0.00523	£(609)	£70.8
London borough	224,850	60.24	27,456	0.00004	£(2,333)	£338.0
Metropolitan council	309,122	19.99	17,303	0.00003	£(4,008)	£243.1
Unitary authority	209,654	13.62	17,944	0.00007	£(1,577)	£178.4

** POP DEN=population density; AVG INC= average income; FV=financial viability; SURDEF=surplus/deficit; DEBT=debt per 1,000 population.

were lost from the full sample due to missing data and extreme values which were deleted. The final sample sizes were 380 for BASE FEE and TOTAL FEE, and 381 for FEE PREM. Regression diagnostics included variance inflation factors to test for multicollinearity, studentised residuals to test for extreme values, and the Glejser test for het-

eroskedasticity. Extreme values were detected and eliminated and White's correction run because of detected heteroskedasticity. All variance inflation factors except district council were below five, suggesting no multicollinearity problems. district council consistently had VIFs about 6.5, moderately problematic but not a variable that could be eliminated or transformed.

The BASE FEE model is significant, with an adjusted R^2 of 90.1%. LPOP and LPOPDEN are positive and significant as expected, while LAVGINC is negative and significant. The negative sign can be interpreted as an indicator of increased audit risk to local authorities as income levels rise. BIG 4 is negative and significant. Similar to the univariate findings, BIG 4 audits are associated with lower audit fees, when compared with district auditors. In most comparable settings 'brand name' audits typically have a higher price (Rubin 1988).¹⁴ SMALL firm audit fees, on the other

¹⁴ It may be that the close relationship between district auditors and the commission has an effect on audit fees. The argument is that DAs have an incentive to charge higher fees, since the Audit Commission benefits financially from the fees charged. The commission states that a fee premium exists for district auditors, because they perform additional duties beyond the private audit firms. As stated by an Audit Commission executive: 'It is perhaps not surprising that the "brand name" of the Big 4 does not attract a price premium, as the audited bodies are not purchasing the brand! It is the commission that buys the brand, and appoints the auditor.' However, Basioudis and Ellwood (2005) found a BIG 4 premium for NHS entities, where auditors also are selected by the Audit Commission.

Table 4
Correlation matrix (Pearson's)

	BASE FEE	TOTAL FEE	FEE PREM	POP	POP DEN	AVG INC	SMALL	BIG 4
TOTAL FEE	98.6*	-						
FEEPREM	0.1	0.0	-					
POP	74.0*	74.6*	-25.3*	-				
POPDEN	53.7*	54.7*	-4.7	32.5*	-			
AVGINC	-4.1	-4.1	6.5	6.7	14.5*	-		
SMALL	-3.0	-7.7	-0.3	-4.8	1.0	13.2*	-	
BIG 4	7.5	7.7	-15.0*	16.2*	10.7**	12.2**	NM	-
DA	-5.2	-2.8	11.9**	-12.1**	-10.3**	-18.3*	NM	NM
County council	27.4*	26.0*	-10.9**	64.0*	-18.4*	3.2	-4.0	14.1*
District council	-90.2*	-91.0*	20.2*	-70.1*	-39.6*	7.5	7.1	-12.1**
Unitary authority	39.1*	39.9*	-9.6	8.0	9.1	-22.6*	-0.4	-3.9
London borough	41.1*	42.8*	-1.5	19.0*	49.4*	34.9*	-7.5	8.6**
CLIENTS	-12.5**	-9.9**	1.7	-5.9	-1.6	-2.8	-52.0*	-51.3*
FV	-54.1*	-54.1*	14.0*	-47.5*	-29.3*	12.9**	0.1	-4.6
SURDEF	-26.0*	-26.6*	18.3*	-21.3*	-27.0*	-1.2	4.2	-7.5
DEBT	55.5*	56.1*	-5.4	29.0*	42.1	7.5	1.2	1.8
County council	DA	County council	District council	Unitary authority	London borough	CLIENTS	FV	SURDEF
District council	-10.6**	-	-	-	-	-	-	-
Unitary authority	7.1	NM	NM	-	-	-	-	-
London borough	3.8	NM	NM	-	-	-	-	-
CLIENTS	-3.7	NM	NM	NM	-	-	-	-
FV	75.1*	0.6	14.2*	-18.8*	3.3	-	-	-
SURDEF	4.2	-20.0*	52.6*	-25.6*	-19.2*	10.6**	-	-
DEBT	4.5	2.6	24.3*	-4.5	-10.6**	0.4	12.9**	-
	-2.3	1.2	-50.4*	14.3*	45.0*	-9.4	-30.6*	-19.9*

(logs used for FEE, TOTFEE, FEE PREM, POP, POPDEN and AVGINC; NM = not meaningful)

* Significant at 0.01; ** Significant at 0.05

** FEE PREM=audit fee premium; POP=population; POP DEN=population density; AVGINC=average income; SMALL=non-Big 4 private audit firm; BIG 4=Big 4 audit firm; DA=district auditor; CLIENTS=number of local authority clients; FV=financial viability; SURDEF=surplus/deficit; DEBT=debt per 1,000 population.

Table 5
Regression analysis with coefficient (t-value)
(extreme values eliminated, White's correction)

	<i>Predicted sign</i>	<i>Log (BASE FEE)</i>	<i>Log (TOTAL FEE)</i>	<i>FEE PREM</i>
LPOP	+	0.315 (10.10)*	0.309 (12.63)*	-0.075 (-3.36)*
LPOPDEN	+	0.060 (5.25)*	0.046 (5.16)*	0.017 (2.13)**
LAVGINC	?	-0.151 (-2.54)**	-0.124 (-2.66)*	0.065 (1.53)
SMALL	?	0.005 (0.08)	-0.120 (-2.29)**	-0.097 (-2.01)**
BIG 4	?	-0.149 (-3.66)*	-0.117 (-3.66)*	-0.123 (-4.19)*
County council	?	-0.339 (-5.10)*	-0.337 (-6.49)*	0.074 (1.55)
District council	?	-0.864 (-15.23)*	-0.737 (-16.55)*	-0.028 (-0.68)
Unitary authority	?	-0.030 (-0.58)	-0.006 (-0.16)	-0.035 (-0.95)
London borough	?	0.111 (1.79)	0.111 (2.25)**	-0.034 (-0.77)
CLIENTS	?	-0.001 (-1.82)**	-0.001 (-2.02)**	-0.002 (-3.01)*
FV	-	-1.828 (-0.66)	-0.648 (-0.30)	2.417 (1.21)
SURDEF	-	-0.000 (0.15)	0.000 (0.19)	0.000 (2.62)**
DEBT	+	0.000 (3.19)*	0.000 (4.27)*	-0.000 (-0.78)
Intercept		11.879	11.838	1.026
Adj. R ²		90.1%	92.2%	11.5%
F Value		267.6*	345.5*	4.8*
n		380	380	381

* Significant at 0.01; **Significant at 0.05

** FEE PREM=fee premium; LPOP=log of population; LPOPDEN=log of population density; LAVGINC=log of average income; SMALL=non-Big 4 audit firm; BIG 4=Big 4 audit firm; CLIENTS=number of local authority clients; FV=financial viability; SURDEF=surplus/deficit; DEBT=debt per 1,000 population.

hand, are not significantly different to district audit fees. Four authority types are compared with metropolitan districts; county councils and district councils have significantly lower fees relative to metropolitan districts. County and District generally are rural, suggesting relatively lower fees for rural authorities. CLIENTS is negative and significant, indicating that industry specialisation results in lower fees, an economies of scale interpretation. Neither financial viability nor surplus deficit is

significant. DEBT is positive and significant, indicative of a higher fee associated with increased credit risk.

The TOTAL FEE model was run to determine if the additional audit-related fees have a different impact than the original BASE FEE decision. While we did not expect a differential impact (because all the audit work is required by the commission), we did test for corroboration. The results are similar to the BASE FEE model, suggesting

Table 6
Probit analysis of auditor selection with coefficient (chi-square)
(extreme values eliminated) – first-stage of Heckman's procedure
Private auditors
Dependent variable is Big 4 dummy

<i>Independent variable</i>	<i>Coefficient</i>	<i>Chi-square</i>
LPOP	0.484	(2.82)
LPOPDEN	-0.410	(11.45)*
LAVGINC	-1.880	(5.66)**
County council	-1.576	(4.82)**
District council	0.186	(0.10)
Unitary authority	2.209	(13.79)*
London borough	-0.476	(0.48)
CLIENTS	0.104	(80.10)*
Intercept	11.938	(2.51)
n	380	

* Significant at 0.01; **Significant at 0.05

*** LPOP=log of population; LPOPDEN=log of population density; LAVGINC=log of average income; CLIENTS=number of local authority clients.

that there are no significant incentives to charge lower audit fees to receive additional audit-related work. The Audit Commission has strict rules for bidding non-audit work, which they identify as a 'regime constraint'. Adjusted R^2 is 92.2%. The only differences in the TOTAL FEE model are: (1) SMALL is negative and significant, indicating that total fees are significantly lower than for District auditors and (2) London boroughs are positive and significant, suggesting higher audit costs.

The FEE PREM model has an adjusted R^2 of 11.5%, much lower than the two previous models. The results differ from the other two models, as expected given the correlation results in Table 4. This model attempts to explain the differences between the total fee and Audit Commission's standard fee. LPOP is negative and significant, LPOPDEN is positive and significant, and LAVGINC is insignificant. Fee premiums are relatively higher for smaller, less crowded authorities. Standard fees are a linear function of expenditures and the negative sign suggests that audit fees rise with size at a lower than linear rate. Both SMALL and BIG4 are negative and significant, suggesting that on average the private firms

receive relatively lower fee premiums. None of the authority types is significant, indicating that the relative premium is independent of type of authority. CLIENTS is negative and significant. The results for CLIENTS are robust across the models, indicating the importance of economies of scale for audit fee pricing. SURDEF is positive and significant, an unexpected result. This suggests that audit fees rise for higher surpluses. Both FV and DEBT are insignificant.¹⁵

6. Sensitivity checks

6.1. Heckman's two-stage procedure

Table 6 presents the stage one results, based on probit analysis.

Stage-one is a probit analysis where the dependent variable is a dummy variable where 1=Big 4 firm and 0=DA. The independent variables are the OLS variables that are consistently significant (LPOP, LPOPDEN, LAVGINC, CLIENTS, and the four authority dummies). All but LPOP, district council and London boroughs are significant.¹⁶

The second stage (Table 7) compares audit fees for Big 4 firms compared to District auditors using Log of TOTAL FEE as the dependent variable. The 75 authorities using Big 4 auditors are compared with the 281 using DA. The OLS results for both BIG 4 and DA compared with the overall results in Table 5, are somewhat different. Several variables are not significant for BIG 4 (LPOPDEN, LAVGINC, London boroughs, and CLIENTS) and DA (LAVGINC and London Boroughs) that were significant in the overall (Table 5) analysis. However, the overall explanatory power as measured by adjusted R^2 was similar at 91.5% and 93.1% for BIG 4 and DA

¹⁵ An alternative analysis to explain relative fee premium is to use TOTAL FEE minus STANDARD FEE as a fee premium measure. (Since negative signs are common, the variable cannot be logged.) In this model, the adjusted R^2 is only 25.7% and LOGPOP is insignificant. SMALL, BIG 4 and CLIENTS are negative and significant, while all authority types are also negative and significant. In other words, the same basic auditor-related results hold in this context.

¹⁶ The Heckman analysis was also run using BIG 4 compared to DA based on BASE FEES and private firms (BIG 4 plus SMALL) compared to DA using both TOTAL FEES and BASE FEES.

Table 7
Regression analysis with coefficient (t-value); dependent variable is log of TOTAL FEE
Big 4 to district auditor comparison, based on Heckman's two-stage procedure

Variable	<i>Big 4</i>	<i>Big 4</i>	<i>District auditors</i>	<i>District auditors</i>
	OLS	Two-stage	OLS	Two-stage
LPOP	0.293 (4.39)*	0.380 (4.20)*	0.305 (11.43)*	0.480 (6.40)*
LPOPDEN	-0.002 (-0.06)	-0.048 (-1.44)	0.052 (5.25)*	-0.109 (-1.67)
LAVGINC	-0.146 (-1.49)	-0.434 (-1.92)	-0.063 (-1.10)	-0.734 (-2.67)**
County council	-0.304 (-2.50)**	-0.528 (-2.65)**	-0.356 (-5.93)*	-0.980 (-3.82)*
District council	-0.707 (-6.34)*	-0.657 (-5.65)*	-0.738 (-14.49)*	-0.656 (-10.88)*
Unitary authority	-0.075 (-0.73)	0.329 (1.59)	-0.020 (-0.43)	1.049 (2.44)**
London borough	0.1630 (1.24)	0.172 (1.59)	0.085 (1.48)	0.224 (2.81)*
CLIENTS	-0.001 (-0.61)	0.018 (1.49)	-0.002 (-3.13)*	0.041 (2.37)**
FV	-13.412 (-1.25)	-10.934 (-1.01)	-0.179 (-0.08)	-0.410 (-0.18)
SURDEF	-0.000 (-0.01)	-0.000 (-0.18)	-0.000 (-0.39)	-0.000 (-0.65)
DEBT	0.001 (2.03)**	0.001 (1.94)**	0.000 (4.67)*	0.000 (4.80)*
Lambda (λ)		-0.203 (-1.41)		-0.482 (-2.50)**
Intercept	11.992 (12.28)*	13.508 (9.34)*	11.305 (20.96)*	15.583 (8.68)*
Adj. R ²	91.5%	91.7%	93.1%	93.0%
F Value	73.6*	68.7*	330.8*	309.7*
n	75	75	281	281

* Significant at 0.01; **Significant at 0.05; λ = Inverse Mill's Ratio

*** FEE PREM=fee premium; LPOP=log of population; LPOPDEN=log of population density; LAVGINC=log of average income; SMALL=non-Big 4 audit firm; BIG 4=Big 4 audit firm; CLIENTS=number of local authority clients; FV=financial viability; SURDEF=surplus/deficit; DEBT=debt per thousand population.

respectively.

The second-stage approach shows some model differences in Table 7. If self-selection is present, it may manifest itself in the change in coefficients as well as the intercept between the OLS and two-stage models. The Big 4 two-stage results are similar to OLS results. The second-stage Big 4 model has four significant variables, LPOP, county councils, district councils, and DEBT. All variables are

significant for DA, except FV and SURDEF. CLIENTS switches signs to positive, a results suggesting a fee premium for increased specialisation. Adjusted R² is similar for both Big 4 (at 91.7%) and DA (93.0%) and when compared with OLS results. The intercepts are roughly similar between OLS and two-stage for both Big 4 and district auditors, indicating no systematic shift when a self-selection correction is applied.

Lambda is a residual calculation of the first-stage probit regression and represents those factors that 'help' self-select into BIG 4 or DA, but are not captured in the OLS model. In the BIG 4 model, Lambda is insignificant, indicating no self-selection bias. Lambda is negative and significant for DA, which indicates a selection bias. This suggests that local authorities that used a DA auditor could have had a more 'efficient' audit (that is, lower fee) by using a Big 4 firm. In summary, the results using the Inverse Mills Ratio provide no evidence of a direct BIG 4 self-selection bias, since Lambda was insignificant.¹⁷

6.2. Size-adjusted model and other robustness checks

To control for client size, OLS regressions are rerun where the audit fee dependent variables (BASE FEE and TOTAL FEE) are scaled by population (Simunic, 1980). The remaining independent variables are the same. Results are summarised in Table 8. Without LPOP as an independent variable, adjusted R² drops to 59.0% in the BASE FEE model and 59.8% in the TOTAL FEE model. Because of extreme values, sample size is 379 in the BASE FEE model and 383 in the TOTAL FEE model. After rerunning the model without the extreme values, there are no additional diagnostic problems (heteroskedasticity was present in the earlier regressions).

Results are roughly the same as in Table 5. BIG 4 is still negative and significant in the BASE FEE model, but insignificant in the TOTAL FEE (BIG 4 would be significant at the 0.1 level). SMALL is insignificant in both models. Some other differences are noted. LPOPDEN, CLIENTS, and surplus deficit are not significant in either model. Financial viability was positive and significant in both models, an unexpected result. In summary, the results are somewhat unsatisfactory. However, the key point is that BIG 4 results are robust in this analysis, still negative and significant.

Following Ireland and Lennox (2002), we used rank transformation to control for size as measured by population. BASE FEE, TOTAL FEE and population were transformed into ranks and the

regressions rerun, with the remaining variables the same (results are not tabulated). Results were similar to those in Table 5. The adjusted R² values were lower, 82.2% for BASE FEE and 84.0% for TOTAL FEE. Seven of the eight significant variables from Table 5 for BASE FEE were also significant with the same signs. The exception was financial viability, which was not significant at .05 (but significant at 0.1). Seven of the 10 variables for TOTAL FEE were significant with the same signs. In both models, BIG 4 was negative and significant.

To determine whether the results were driven by specific private auditors, the OLS models were rerun using dummy variables for each private auditor (three BIG 4 and three SMALL). (Results are not tabulated.) All private firm dummies were negative and significant for the TOTAL FEE model. However, one SMALL audit firm was positive and significant for the BASE FEE model (all others were negative and significant). This firm audited nine local authorities. Unlike the other audit firms, the base fees and total fees were identical (averaging £83,378 or £821 per 1,000 population). In other words, this auditor provided no additional audit work.

As an additional test, the regressions were run using nominal values for audit fees, size and demographic variable rather than their logged values (not shown). In the earlier models, the log values for fees, size and demographic data were used because of skewness and long tails. This may understate the impact of the dummy variables and other non-logged variables. White's consistent t-statistics were calculated according to heteroskedasticity in the model. The results were generally the same in the TOTAL FEE model, except that SMALL was insignificant (BIG 4 continued to be negative and significant). The local authority dummies were more highly significant than in the earlier models. However, in the BASE FEE model, both BIG 4 and SMALL were insignificant.

The regression models also were rerun by local authority size groups—above and below the average 120,000 in population (results not presented). The findings were essentially the same across both size groups and comparable to the full sample (except for excluding local authority types). In all models, BIG 4 was negative and significant. In summary, there is evidence in most models that the BIG 4 firms provide a discount, but no evidence that BIG 4 charge a premium in any of the models.

7. Conclusions

The purpose of this paper was to introduce a model of audit fees of local authorities in England and Wales, and test it. The regression results have high explanatory power and work well to explain fee differences. Descriptive analysis indicates that ac-

¹⁷ The Heckman results were somewhat different for the other models. When BIG 4 was compared to DA using BASE FEE, Lambda was insignificant for both BIG 4 and DA indicating no self-selection bias. However, when all private audit firms were compared with DA, Lambda was negative and significant for private firms for both definitions of audit fee; the Lambda for DA was significant and negative only for TOTAL FEE. This suggests that fees are selected to provide lower fees than provided by the other audit category. In other words, when private firms are chosen, this provides lower fees than if a DA was chosen. On the other hand, when DA was chosen (using the TOTAL FEE definition), these districts also received relatively lower fees. In summary, there is evidence for fee bias in some models, but no statistical evidence of a BIG 4 bias.

Table 8

**Regression analysis with coefficient (t-value) (extreme values eliminated);
dependent variables: BASE FEE and TOTAL FEE divided by population**

	<i>Log</i> (BASE FEE / POP)	<i>Log</i> (TOTAL FEE / POP)
LPOPDEN	-0.014 (0.85)	-0.024 (0.19)
LAVGINC	-0.388 (-4.48)*	-0.382 (-4.60)*
SMALL	-0.098 (0.98)	-0.055 (-0.57)
BIG 4	-0.132 (-2.15)**	-0.108 (-1.85)
County council	-0.981 (-11.11)*	-0.986 (-11.63)*
District council	-0.215 (-2.97)*	-0.079 (-1.13)
Unitary authority	0.266 (3.59)*	0.317 (4.44)*
London borough	0.458 (5.16)*	0.489 (5.72)*
CLIENTS	-0.001 (-0.53)	-0.001 (-0.73)
FV	9.673 (2.39)**	11.213 (2.88)*
SURDEF	0.000 (1.46)	0.000 (1.93)
DEBT	0.001 (4.18)*	0.001 (3.97)*
Intercept	10.432	10.598
Adj. R ²	59.0%	59.8%
F Value	46.3*	48.4*
n	379	383

* Significant at 0.01; **Significant at 0.05

*** FEE PREM=fee premium; LPOP=log of population; LPOPDEN=log of population density; LAVGINC=log of average income; SMALL=non-Big 4 audit firm; BIG 4=Big 4 audit firm; CLIENTS=number of local authority clients; FV=financial viability; SURDEF=surplus/deficit; DEBT=debt per 1,000 population.

tual audit fees are usually above the standard fees set by the Audit Commission. Big 4 firms receive lower fees on average than district auditors. Audit fee differences were noted across local authority categories, with London boroughs having the highest fees, *ceteris paribus*. The actual fee premium over the standard was significantly lower for private audit firms.

Regression results provided basic information on multivariate relationships. Population size, population density, and number of clients were consistently significant in the fee and total fee

models. Council types as measured by dummy variables also were often significant. Population was negative and significant in the fee premium models.

Relative to existing literature, the most surprising finding was the negative coefficients for Big 4 audits, indicating lower fees than those for district auditors. Heckman's two-stage procedure, which was run as a robustness check because of the potential self-selection problems, provided ambiguous results, although the results generally indicate that there is, indeed, an audit fee discount for

Big 4 audits.

Additional analysis needs to be conducted on local authority audits in England and Wales, especially related to audit quality, which is reviewed by the commission. The relationship between audit fees and audit quality seems especially important given the regulatory environment of the Audit Commission. Differences in audit quality may relate to auditor type. The models can be expanded to capture additional data and factors that may relate to audit economic relationships. Changes over time (the regulatory environment has been dynamic, with substantial changes made over the previous 20 years) may show significant differences. Time series analysis is encouraged to capture these changes.

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Financial and external reporting research: the broadening corporate governance challenge

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Abstract—This study provides a critical examination of contemporary financial and external reporting research from a corporate governance perspective. Adopting Hines' social constructionist approach to financial reporting, the study investigates research into accounting publishing patterns, published reviews of major subject areas within financial and external reporting research, and interviews a sample of accounting professors in British universities. The findings reveal a strong North American economics and finance-based positivist influence, a largely uncritical acceptance of accounting's subservience to the demands of the market, a reluctance to engage major policy questions and broader reporting constituencies. These appear to be conditioned to a large degree by internal features and pressures within the academic research community. Evidence is presented for greater attention to major environmental shifts impacting accounting and communities globally, a reinvigoration of researchers' direct engagement with reporting constituents in the field, a revisiting of major accounting, business, social and environmental policy questions, and a preparedness to address today's major corporate governance concerns of communities and governments.

Key words: Accounting policy; accounting research; corporate governance; external reporting; financial accounting; financial reporting

1. Introduction

Financial and external reporting (FER) research has arguably maintained itself as a major area of accounting research, both in the UK the US and internationally. It has developed from a normative and policy-oriented focus in the 1950s–1970s, into an economics based, mathematically and statistically-oriented empirical positivism. How does this relate to the corporate governance challenges and debates surrounding both profit and non-profit organisations in today's economies and societies?

This paper offers a critical reflection on the current state of FER research, with particular focus on its emphases, dominant issues, gaps and challenges. Rather than offering an exhaustive review of research achievements and coverage to date, informed by a social constructionist perspective, it

presents an intentionally selective examination of outstanding challenges from a broad scope societal responsibility point of view.

To this end, the study involved a revisiting of researchers' published reviews of constituent areas within the FER research literature, along with interviews with 12 UK accounting professors. These professors were interviewed concerning their assessments of the relationship between the finance and financial accounting research literatures, the prevailing issues being addressed by the FER research community, the dominant research methodologies employed, currently neglected subject areas, the financial/external reporting/corporate governance relationship, accounting research community failures, and priority issues for the ongoing FER research agenda.

The paper will first outline the analytical perspective adopted, briefly address the relationship between FER and corporate governance, comment on a recent review of UK financial accounting research publishing and then examine major areas of FER research already subject to recent review by scholars. The paper will then draw upon the reflections of interviewees to offer both assessment and critique, concluding with proposals for the ongoing FER research agenda.

2. A social constructionist perspective

Much FER research still focuses upon accounting as a neutral technicist phenomenon best addressed through a methodology focused upon modelling

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and predicting market reactions to disclosure patterns and characteristics. A large modicum of FER research is predicated on an implicit and explicit quasi-religious belief in naturally occurring markets, the pre-eminence of impersonal pricing mechanisms, and the role of accounting as an independent financial communication mechanism. Moral and processual questions of context-action interplays, actors' interpretations, social critique and normative policy largely lie outside the perceived remit (Hines, 1989a; Laughlin, 1977; 1987). Positivism, realism and conventionalism dominate underlying methodological choice and levels of prior theorisation (Laughlin, 1995). The researcher's direct engagement with the field and its actors is minimised and the resulting narrative is largely quantified (Laughlin, 2004).

As accountants have created and appropriated an increasing scope of areas of work and related expertise claims in their professionalisation project, so FER researchers have arguably appropriated the philosophies and methodologies of the natural sciences, particularly via the fields of economics and finance. Arguably, their research objectives and scope of studies have become conditioned by the stereotypical methodological limits of scientific method to which many have become wedded. The name of the game is treating accounting information as an economic good, focusing on rational, utility maximising shareholder behaviour, and researching 'what is', in a world 'out there', as objectively as possible (Laughlin, 1981; Hines, 1989a,b; Hines, 1992; Parker, 2001). When positivist researchers arrive at unexpected results, they do not necessarily reject or amend their implicit meta-theories but explain anomalies via critiquing data sampling and analysis methods and attributing failure to the *ceteris paribus* assumption. The underlying philosophies, focus and research approaches underpinning the positivist tradition remain unquestioned: by researchers, reviewers and journal editors (Hines, 1991; 1992). The reality represented in many FER studies, is therefore a segmented view, abstracted from the institutional, societal and political context, being confined to economic variables, the relationships and impacts of which are to be predicted and thereby controlled (Hines, 1992).

There is, however, an increasingly recognised alternative view that argues that reality cannot be envisaged separately from thought, language and social practices. Instead accounting can be conceived as participating in the social construction of actors' realities (Hines, 1988, 1989a, 1991; Laughlin, 2004). From individuals to societies, Hines (1989a) argues that we reflexively employ prescriptive and descriptive accounts of reality to both constitute and reproduce it. FER concepts and language as constructions are so vital to the opera-

tion of organisations and society, that their routines and measurements have been historically contested and revised. Such contests and revisions are invariably the product of complex processual interactions of social, political, and institutional (as well as economic) environments. Yet much FER research privileges a materialist world that is purely economic.

Alternatively, we can recognise a world in which FER is socially constructed, thereby admitting the possibility of irrational behaviour, reconstructed and broadened views of what accounting is and can be, and redefined concepts of validity, credibility and reliability. How accountants and researchers construct their 'accounting reality' can ultimately affect the way society commonly interprets the organisational and financial world. Both accountants' and researchers' constructions of accounts influence how other members of society 'see' and 'interpret' the world around them. A narrow FER economic view can therefore confine generally received societal perspectives, creating, legitimising and reifying a status quo that ultimately may be to the detriment of the public good (Hines, 1988, 1989a, 1991). The pictures that FER researchers and professionals paint can present a view of the world that forms the basis for people's actions which, if similarly economically and quantitatively focused, are likely to beget consequences similarly constituted and hence apparently confirming the initially portrayed economic world. So in communicating 'reality' FER researchers and professionals construct the community's reality! The question then arises as to what happens, for example, when corporations fail and the community discovers that there was 'reality' other than the one painted by accounting? Even in narrow economic terms, they may quickly redefine their reality such that it becomes a self-fulfilling one (e.g. company liquidation due to creditors' reactive demands for immediate payment). Of course FER research largely focuses on accounting and associated market behaviour in aggregate, often having little to say about specific individual cases (Hines, 1988, 1991, 1992).

The above constructionist perspective, particularly informed by Hines' and Laughlin's articulations of the positivist alternatives, is briefly presented here for the dual purposes of outlining the philosophy underpinning the analysis and critique offered in this paper, and for identifying gaps and potentials in FER research. Rather than attempting the pursuit of representing and predicting some existential reality that mythically exists 'out there', FER research may be better directed towards understanding and assisting the construction and fulfilment of multiple realities by a whole range of actor groupings that are involved in, relate to or are affected by organisations and institu-

tions (Hines, 1991). This requires grappling with the nature and impact of such groups' imputed multiple historical and social meanings that lie behind and beyond objectivist, technical accounting numbers and reports. Such apparently intangible values and interpretations, may carry significant implications for the shape and impact of what we customarily think of as tangible accountings (Laughlin, 1987). Why bother? While this represents a major departure from and challenge to the safer and more comfortable routines and generally accepted limits of positivist FER research, it offers the opportunity for researchers to contribute to the societal pursuit of 'the better life' across a broad canvas that includes but stretches well beyond the economic (Laughlin, 1987). As Hines (1992) puts it, we have the capacity to research the empty or negative spaces: those areas of organisational and societal activity and life that are marked by silences, for which there is no market value, for which there are unexplained irrationalities and apparent dysfunctions, and for which there is no accounting or representation (Choudhury, 1988; Arrington and Francis, 1989; Inkpen and Choudhury, 1995).

3. The governance question

Since the beginning of the last century, corporate governance has arguably commanded the highest levels of attention and debate among legislators, regulators, professions, business bodies, media and in the general community (Parker, 2005a). The litany of international corporate frauds and failures has brought company directors, accounting regulations, auditors, and the accounting profession into sharp focus and subject to severe criticism. Imhoff (2003) argues that in the US the financial reporting regimes, particularly through cash bonus and stock option plans based on accounting results, have presented managers with incentives to manipulate financial results and delay or conceal bad news. Window-dressing is employed to apparently exceed shareholders' expectations. Board members also are often compensated with stock options, which thereby can induce them to avoid recognising or dealing with unfavourable corporate performance, and to mask unfavourable financial news. Such a predicament stands in somewhat amusing juxtaposition to financial accounting researchers' most heavily researched corporate governance issue, namely the use of accounting performance measures in management compensation contracts! (Bushman and Smith, 2001; Sloan, 2001).

Despite this, Imhoff (2003) sees corporate governance as problematical in its relationship to the vexed issues of financial reporting integrity. In the face of the major crisis in corporate governance and financial reporting, the accounting research community's response has been lamentably slow

and inadequate. Sloan (2001) contends that while there is great potential, there exists a dearth of research into the role of financial accounting in corporate governance published in accounting research journals. He argues that today many accounting researchers have financial economics expertise and thereby conduct governance research unrelated to accounting. Parker (2005a) too, finds a relative dearth of financial accounting research analysing or responding to the corporate frauds and failures of recent times, save for a small coterie of accounting researchers (e.g. Clarke et al., 1997; Clarke and Dean, 2002). Yet as Sloan (2001) points out, financial accounting information is both an input to and a product of the corporate governance process.

However the external corporate reporting/corporate governance relationship is not limited to financial compensation and results alone. As Bebbington (2004) explains, governance is about a suite of broad responsibilities at corporate level that extend to accountabilities that include corporate social and environmental impacts. These raise issues of accountability and reporting transparency that go beyond financial status and results. Sarre et al (2001) see them as involving much more than compliance with legal responsibilities, extending to accountability for responsible performance for the common good. Such an interpretation of the external corporate reporting/corporate governance relationship opens up significant new horizons for accounting researchers.

Why has corporate governance received such narrow or inadequate levels of attention from financial accounting researchers? Parker's (2005a) interviews of senior Australian and New Zealand accounting academics provides some clues. They cited the time and effort involved in examining and diagnosing data on corporate crashes, a fear of rapidly declining topicality of particular corporate failures, difficulties in accessing inside company information, and a fear of potential litigation being brought by companies cited. More fundamental barriers to such research were suggested to take the forms of a tendency in the financial accounting research community to mimic North American positivist style research and accordingly concentrate on narrowly focused positivist studies rather than tackling critical, case study-based research into corporate failures. The statistics cited in Beattie's (2005) and Searcy and Mentzer's (2003) recent review studies bear this out. It is to these that we now turn.

4. British financial accounting publishing

Beattie (2005) has provided an invaluable review of recent financial accounting research and publication from a UK perspective. Here she recognises the North American predisposition towards

empirical behavioural accounting and market based accounting research with their associated foci upon short time horizon event studies, capital market consequences of accounting standards and disclosures, earnings management studies, and financial analysis and equity valuation studies. While arguing that more UK researchers have broader interests (e.g. social and environmental accounting), the tendency of many UK researchers to follow the US preoccupation with positivist quantitative research is still apparent. The North American predisposition towards positive economic theory-based accounting research is amply illustrated by Searcy and Mentzer's (2003) admittedly restricted sample of four accounting research journals classified as top-ranking in the US¹ which finds that only AOS has published research falling outside the positivist worldview (representing 11.5% of total articles in the four journals). While Beattie's tabulation of research areas shows market-based accounting research to constitute 25% of her sample of UK publications in financial accounting, the positivist approach can also be found in other areas reported in her study, such as earnings management, accounting choice, economic consequences and failure prediction.

Beattie's (2005) sample of published studies (1998–2002) reveals the dominance of what she terms archival research in UK financial accounting. However, this is not a term used in the historical methodology sense, but rather refers to the largely quantitative modelling and testing of data drawn from annual reports, market and analysts' forecast data. Consistent with interviewee observations in Parker's (2005b) study, case study and interview research methods in Beattie's study constituted less than 10% of methodologies employed in the sampled publications. This stands in marked contrast to the growth in market-based studies which, as Beattie rightly observes, fail to investigate financial reporting, usage and decision-making processes. We are left with predictive models and analyses of inputs and outputs, while remaining ignorant of the processes within the intervening 'black box'. Yet it is in this processual area that our greatest ignorance and accompanying greatest potential for accounting policy contribution lies. Given financial accounting researchers' predisposition towards North American inspired quantitative research, their neglect of case and field study research is predictable. Searcy and Mentzer's (2003) study of the influential top-rated North American accounting research journals, finds that only 9% of articles (representing all accounting

subject areas) published in their sample period, employed these methodologies.

In her review of main financial accounting research areas, Beattie comments that most theoretical papers in the field are now analytical modelling exercises conventionally embodying simplifying assumptions that cannot capture the complexities of practice and often carry no direct policy relevance. In addition she observes the rapid rise in market-based accounting studies, fed by the availability of low-cost databases, economics, mathematical and statistical training of researchers (admittedly more in the US than the UK) and the short completion time-scales often possible for such projects. This points to a predisposition among at least a segment of the accounting research community, to utilise familiar tools in search of short-term publishable projects, rather than prioritising issues of major business, government and public policy importance. This positivist modelling predisposition may be further accentuated by the type of training and research philosophies being inculcated in PhDs, the PhD backgrounds and institutional affiliations of the accounting research community elite – namely research journal editors and their referees, and British and overseas business school journal rankings that privilege North American economic based positivist accounting research journals (Lee and Williams, 1999; Searcy and Mentzer, 2003). These represent a quite remarkable mimicry of a North American business school research bias that is increasingly being criticised as narrow, scientific and inappropriate to business conditions and problems by leading US business school scholars themselves (Bennis and O'Toole, 2005).

5. Major issues

What follows is a brief outline and critique of presences and absences in the FER research literature (Choudhury, 1988; Arrington and Francis, 1989; Inkpen and Choudhury, 1995). These are largely based upon a selection of extant reviews and critiques in the published accounting research literature. The selection has been derived from extensive electronic journal searches, but does not purport to be all-inclusive, nor to cover more than a sample of subject areas within the purview of FER.

5.1. Capital markets research

Healy and Palepu (2001) review empirical capital market studies of corporate disclosure.² In doing so, they highlight significant factors in the economic environment that may affect financial reporting and disclosure: including technological innovation, network organisation structures, and the globalisation of capital markets. Notably, they confine their assessment to economic factors.

¹ *Accounting, Organizations and Society (AOS), The Accounting Review, Journal of Accounting Research, Journal of Accounting and Economics* 1995–2000.

² The papers reviewed are almost exclusively North American.

They also point to the virtual absence of research into the regulation of disclosure which they find surprising given the profile and preponderance of regulated disclosures. They find accounting research to be focused on the question of whether accounting standards add value for investors or other stakeholders: expressed in capital markets research as the relationship between accounting information and security prices. The most significant outcome of this research appears to be the conclusion that regulated financial reports present relevant new information to investors. The question of the value of regulated versus unregulated information remains, however, an open question. In addition, the authors argue that little is known concerning the reasons behind the regulation of financial disclosure in the capital market.

Managers' capital market disclosure decisions have been attributed to a number of factors: capital market transactions and investor perceptions, contests for corporate control, stock-based management compensation plans, the threat of shareholder litigation, proprietary costs of disclosure impact on competitive position, and management talent signalling (Healy and Palepu, 2001). The focus of all this remains clearly upon management and shareholders' interests. Government, community and public interests do not appear to be on the radar screen. In addition, they report that studies of accounting method changes find, at the announcement of the accounting change, no significant relationship between stock returns and contracting or political cost considerations. Interestingly, Healy and Palepu echo Hines' (1991, 1992) critique of positivist accounting research, in that while tipping their hat to the possibilities that accounting decisions do not influence shareholder wealth, they also raise technical means of explaining away such results by alluding to the difficulty of measuring stock price effects for many events studied, and to the possibility that maybe contracting and political costs are not important economic explanators of wealth effects of reporting changes (implying that other explanators may exist). Of interest here are some of the truly fundamental unanswered questions they identify:

- What is the objective of regulating disclosure?
- What type of accounting standards produce high quality reports?
- Why do companies engage in voluntary disclosure?

Drawing on a range of internationally published³ research, Saudagaran and Meek (1997) review the relationship between international capital markets

and financial (transnational) reporting by multinational companies. Of major concern to them is the state of research into diversity versus harmonisation of accounting and disclosure practices. They find that recent research into causes of diversity in accounting practices has produced little by way of significant new findings. Their review also reveals little attention being paid to comparative analyses of standard setting, especially as a potential explanator of diversity in standards and practices internationally. They do find a range of study results that suggest that diversity in accounting and/or tax methods can affect international corporate merger activity, concluding overall that the effects of international accounting diversity are perceptible: affecting terms of transactions and capital market participants internationally.

With global trade growth and the internationalisation of capital markets, accounting harmonisation is identified by Saudagaran and Meek (1997) as a major international business issue. Here they express concerns at the temptation for developing countries, lacking resources to build their own standards, to capitulate to a wholesale adoption of International Accounting Standards in pursuit of global respectability for their financial reporting, despite their own differential requirements. In addition from the accounting literature, they identify harmonisation obstacles, including opposition from countries anticipating unwanted economic effects, political nationalism, and the views of strong professional bodies within some countries. While they cite studies of harmonisation within the EU, and in other economic trade blocks around the world, Saudagaran and Meek find little empirical research into the success of harmonisation at the global level. Instead, their review of research finds reporting practices still anchored in national requirements, and international capital markets inducing additional voluntary disclosures that vary in type of information provided. However, disclosure requirements appear not always to be met, and indeed the same company information is not always released in all locations. The international picture is further clouded by the lack of any systematic patterns of disclosure or GAAP across countries or over time. The role and impact of accounting information in international capital markets therefore, despite the volume of research to date, appears still to be little understood. Saudagaran and Meek also observe that most of the research to date focuses upon annual reports and earnings announcements. Yet they admit that other forms of disclosure, such as press releases, web-based reports and information for financial analysts, may be overtaking these.

5.2. *International accounting research*

Gernon and Wallace's (1995) review of interna-

³ Their sample of papers is drawn from European, British, Australasian and North American journals.

tional accounting research makes an observation consistent with Hines' (1989a,b, 1992) critique of positive accounting research, namely that much international accounting research is focused on actual present practices and behaviour, rather than focusing on what is *possible*, *probable* or *desirable*. They report that while international accounting researchers have investigated intrinsic factors potentially influencing organisational choice of accounting practices and quality of accounting reports, there remains a need to synthesise the literature on firm specific characteristics of corporate reporting in order to move the field forward. They also point to the inadequate state of knowledge and theorisation about organisational strategies of cross-national professional accounting firms, the way in which these firms organise themselves. The lack of observed theorisation extends to what they see as the lack of theories of change articulated in support of statistical models presented, particularly as many of the latter assume the attainability of an equilibrium state in an international world of rapid and complex change. Consistent with this paper's call for contextualised accounting research, Gernon and Wallace (1995) highlight the relevance and value of contextualised research in international accounting, where national differences can loom large, even in a globalised world. In this respect they bemoan the confinement of many researchers' treatment of cultural context to the limited framework developed by Hofstede (1980).

More recently, Prather-Kinsey and Rueschhoff (2004) have analysed international accounting research in 41 US and non-US academic journals for the period 1981–2000. They found that financial accounting constituted 41% and economic analyses constituted 15 % of the topics researched, with financial accounting and reporting papers showing the highest growth rate over the two decades. Capital market studies represented 25% of total international articles and 61% of total financial accounting studies. Financial reporting topics comprised 55% of so-called top-tier US journals' international accounting articles. Juxtaposed with this profile, Gernon and Wallace (1995) had already observed a fundamental two-way split in international accounting research – between global statistical versus contextual case study approaches. Despite their call for greater attention to contextualisation, they see a contradictory tendency in international accounting researchers to prefer generalisable, universal findings pursued via the positivist statistical route.

5.3. Intellectual capital accounting research

Compared to the foregoing two areas of FER research, intellectual capital accounting research is in its infancy. It goes beyond the conventional ac-

counting research into intangibles which tends to be restricted to considerations of such issues as the accounting treatment of goodwill, research and development, and patents. Yet a wide variety of other potentially value creating intangible assets have been ignored by conventional accounting practice and many FER researchers (Canibano et al., 2000). Reacting against the narrow definition of intangibles that excludes such assets as human resources, customer loyalty and company reputation, intellectual capital accounting broadens the scope of accounting to include both structural and human capital (Brennan and Connell, 2000). These are generally represented in three subcategories (Guthrie and Petty, 2000):

- a. internal structure – including items such as R&D, concepts, models, patents, administrative and computer systems;
- b. external structure – including customer relationships, brands, trademarks and reputation;
- c. human capital – including employee education and skills, training, staff values and experience.

Brennan and Connell (2000) have reviewed developments and research in this area, finding that models of classification and reporting are varied and still evolving. They point to the two frameworks for managing intellectual capital most cited as being those employed at Skandia and Dow Chemical, both of which manage intellectual assets to enhance their value-adding potential for their organisation. Their review of empirical research in this field covered studies in the Netherlands, Scandinavia, Austria, Canada, Australia and Ireland and reports focal research objectives as including intellectual capital frameworks and statements, and the measuring and reporting of intellectual capital. The studies employed a full suite of research methodologies including interviews, case studies, questionnaires, annual report content surveys and focus groups, with case study being particularly popular.

Empirical study findings contain somewhat contradictory aspects. Canibano et al. (2000) report studies showing a positive relationship between patents and the market value of companies, contradictory and inconclusive evidence on the stock price impact of brands and trademarks, a lack of clear relationship between customer satisfaction and corporate financial and stock price performance and a scarcity of empirical evidence about the relevance of human resources to equity valuation. Much obviously remains to be done in expanding and pursuing this research agenda. However, Brennan and Connell (2000) report that on the one hand, intellectual capital emerged as being regarded as important to companies' long-term success, with companies managing their own intellectual

capital reported as outperforming other companies and with human capital being highly regarded as a valuable asset. On the other hand, they also find that intellectual capital appears to be rarely reported in annual reports and when reported lacks a consistent reporting framework.

So as Guthrie and Petty (2000) argue, there appears to be a deal of empty rhetoric attached to measuring, valuing and reporting intellectual capital. They conclude that currently there is greater corporate interest in understanding the locus of a company's core value than in measuring it. Despite these contradictions, the case for accounting researchers' greater attention to intellectual capital accounting research is amply demonstrated by Guthrie and Petty's observations on the Australian economy. They report that while previously the top 50 companies in Australia were dominated by industries requiring heavy capital investment, such dominance is now challenged by companies in the financial services, media, telecommunications, consulting and tourism sectors. By the late 1990s, of the top 10 companies, eight had a preponderance of intellectual capital. While FER researchers have remained strongly wedded to capital markets-oriented research, a whole new organisational world, requiring new and innovative accounting and reporting, appears to be opening up.

5.4. Internet reporting research

Internet reporting represents another FER domain that has been experiencing exponential growth in the corporate sector, while failing to attract commensurate attention from accounting researchers. Craven and Marston (1999) report studies of company practice in the late 1990s as indicating even at that time almost 90% of top 100 Fortune Global 500 companies, over 90% of top UK companies and 90% of all Finnish companies have a website. In the European context, Lymer (1999) reports observations that corporate websites have been progressing through developmental stages from experimental loading of annual reports, then to provision of news and background information beyond annual financial data for investors, and subsequently towards video feeds and real-time voting for AGMs. Further study results include the majority of Fortune 150 companies loading their earnings announcements onto their corporate websites on the day immediately following their public announcement. In terms of motivation towards corporate internet reporting, to date the research suggests that corporate size is positively related to financial disclosures on the internet, extent of financial disclosure is unrelated to industry type, country of origin is unrelated to voluntary disclosures on internet, while corporate attitudes to stakeholders may be a more important explanator of internet disclosures (Craven and

Marston, 1999; Lymer, 1999).

Lymer (1999) has summarised a raft of issues for FER practice and research that will be triggered by the further expansion of corporate internet reporting. These include its management, control and regulation, the structuring of data and formatting of reports, the setting of electronic reporting standards, the assuring of reliability and prevention of tampering with information and the potential for demand and supply of disaggregated data. In addition, these developments raise the prospect of new forms of external reporting, real-time reporting, and the provision of greater volumes of information. Against such far-reaching implications for FER stands the relatively limited attention still being paid by accounting researchers (Gallhofer and Haslam, 2006).

5.5. Accounting communication research

This area of FER research tends to have been pursued by a small select minority group of researchers, and over time has received a level of attention from the accounting research community incommensurate with the arguably crucial role of effective communication in the FER process. Two publications almost a decade apart, reflect on aspects of research in this subject area, Parker's (1986) monograph providing a state of the art review of communication via financial reports, and Jones and Shoemaker's (1994) review of empirical research in content and readability of narratives in annual reports. Across the 1980s and 1990s, these illustrate the persistence of the issues over time. Parker (1986) reports on researcher concerns and debates about traditional versus broader scope corporate reporting objectives, as well as the identity of the report audience, including the degree to which groups such as private investors and financial analysts should be targeted and catered for. Studies cited revealed a need for greater attention to analysts and sophisticated report user preferences and interpretations, and discussions of the potential for producing simplified financial presentations for private investors also catering to their preferences and skills. Indeed, a considerable number of studies of private investor report reading patterns and preferences are summarised from the 1970s and 1980s. Studies in this period also paid attention to report producer intentions and preferences.

The 1970s and 1980s also saw an upsurge of reporting language and readability studies which found ease of reading levels of much of the content of annual reports to be pitched at the higher levels of difficulty, with reading ease over time appearing to be worsening and potentially inaccessible to unsophisticated audiences. Alongside these findings, Parker (1986) reports a growing number of studies addressing the issue of differential reporting for

different target audiences. Possibilities canvassed included supplementary reports for financial analysts and advisors, separate summary financial review sections, separate annual report sections for different major user groups, and the further development of summary highlights (year in review) statements within annual reports. Even at this stage, Parker found that accounting researchers had focused mostly on what Hines (1989a,b; 1992) referred to as 'What is' research, namely observing producer and user behaviour and preferences rather than committing to development of models or frameworks for future practice.

Almost 10 years after Parker's monograph, Jones and Shoemaker (1994) reviewed the use of empirical content analysis studies of narrative disclosures in FER research. This type of research has fallen into two groups:

- a. identifying and analysing major themes within reports;
- b. analysing the cognitive ease of readership of report contents.

Thematic studies have investigated management attitudes towards issues such as social responsibility, environmental performance and 'good' or 'bad' financial performance. They have examined for correlations between narrative disclosures and financial performance indicators, extracted key themes in tax case court records, examined the impact of comment letters on accounting standards pronouncements, and examined narratives for compliance with standards or violations of quality control. Readability studies have investigated the degree of difficulty in reading annual reports, differences in reading difficulty between different sections of annual reports, differences in reading difficulty between different types of reports (e.g. employee reports versus summary highlight statements), whether annual reports have become more difficult to read over time, and associations between reading difficulty and other variables such as net profits, and other risk and return indicators.

Overall, research to date has found that annual reports are generally pitched at the difficult or difficult to read level, and that over time, annual reports have become increasingly difficult to read. However, such conclusions are limited by the lack of consensus about the degree to which readability measures approximate people's comprehension. Jones and Shoemaker (1994) signal a range of issues for further research in this area, including developing new theories to better understand management motives and behaviour in the communication process, changes in readability over time, comparisons of readability of a full range of corporate report types, cross-national differences in readability, and accounting texts readability.

One other aspect of accounting communication

research deserves mention here. Corporate financial reporting to employees experienced an upsurge in interest among accounting researchers in the 1970s and early 1980s (e.g. Purdy, 1981; Pope and Peel, 1981). Parker (1977) documented British developments in the 1970s, and Lewis et al. (1984a,b) examined the fluctuating levels of management and accounting research attention to this subject over most of the 20th century, finding a lengthy but intermittent history of both research and practice, as exemplified in a range of papers published in journals and books across the US, UK, Australia and elsewhere (Parker, 1988). While not entirely surprising given Lewis et al.'s findings of researchers' fluctuating interest in this subject across (approximately) 20-year cycles, it remains nonetheless curious that since the mid to late 1980s, except for some interest in wage bargaining disclosure (Frantz and Walker, 1997; Pope and Peel, 1997), virtually no further accounting research has been published on this. Arguably, many employees devote a greater percentage of their lives to their employing organisation than any shareholder or creditor, and therefore merit serious consideration as a stakeholder for FER purposes. On the other hand, the dramatic moves in western economies over the past 20 years towards casualisation of the workforce may be signalling a new attitude towards employees as a disposable, temporary, external resource no longer meriting any targeted FER. However, such an explanation fails to account for the apparent rising interest in accounting for intellectual capital, unless employees' knowledge is to be *accounted for* as a valuable asset, but as increasingly temporary outworkers, they are no longer to be *accounted to*! Accountability and ethics issues loom large for accounting researchers who might care to consider this apparent contradiction.

5.6. Social and environmental accounting research

Just as Beattie's (2005) study has found, social and environmental accounting (SEA) research has emerged as a significant subset of the contemporary FER research literature. Yet it is still being ignored by the majority of accounting researchers and by some (particularly North American) leading research journals. Significantly, a number of reviews of developments in this field of research have been written in recent years. These include papers by Mathews (1997, 2003, 2004), Gray (2000, 2002), Belal (2002), Berthelot et al. (2003) and Parker (2005b).

Observations from across these review studies suggest that the community of SEA researchers, while growing, remains a relatively small minority group in the overall cohort of FER researchers, with few such SER researchers to be found in North America. A variety of theories inform SEA

research, with a healthy related debate and introspection ongoing within the research community. Again consistent with Hines' (1989a,b, 1992) concerns about an excessive focus on researching 'what is', such SEA researchers as Gray and Mathews call for renewed attention to the normative research agenda, with Gray (2002), Adams (2002), and Parker (2005b) calling for greater attention to studies that include researcher engagement with actual corporate reporting practice in the field. Alongside their critiques of academic researchers' engagement with practice, is the reporting of studies indicating that despite growing numbers of companies at least acknowledging social and environmental issues in their reports, practising accountants themselves appear to be barely, if at all, engaged. By way of caveat, just as SEA researchers have lately discussed and debated the risk of 'capture' of the SEA field by corporations and others for their own purposes, so Belal's (2002) study of UK firms' SEA reporting practices suggests that many corporations' commitment to and practices in SEA are limited to a self-serving interest in boosting corporate profits and managing stakeholders rather than being committed to open and transparent accountability.

Parker's (2005b) study reveals a trend in the recent past for researchers to be focusing upon environmental accounting and reporting to the detriment of social responsibility issues such as minority employment, employee health and safety, corporate philanthropy, community relations and ethical investment. Parker's study also reports the utilisation of the full suite of research methodologies by SEA researchers, including field/case study, interviews, surveys, and content analysis. Major topics of focal attention in the published literature include national practices, national comparisons and regulations, international codes and standards, and external disclosure generally.

It should also be acknowledged that SEA research has also included a considerable number of capital market-based studies looking for relationships between SEA disclosures and their drivers such as corporate size, industry category and so on, and for relationships between SEA disclosures and corporate profits. Findings have been mixed and contradictory. The best that can be said is that propensity to disclose appears to be positively related to corporate size, exposure to litigation, extent of media attention, and environmental lobby group action (Berthelot et al., 2003). In terms of the association between SEA disclosures and corporate profits or stock prices, generally evidence to date suggests that SEA disclosure does not appear to be associated with reduced profits, but on the other hand it cannot be clearly said to be associated with profit increases (Berthelot et al., 2003). Such mixed results most likely prompted

Saudagaran and Meek (1997) to exclude this field from their review of research into international capital markets and financial reporting by multinational firms, stating that the relationship between such capital markets and this form of reporting was not yet clear.

Particularly from the more UK/European perspective, more critical theoretical frameworks are being brought to bear by SEA researchers concerned to challenge the corporate/institutional status quo and to move the SEA focus firmly back onto social and environmental accountability to community and society. What remains as a challenge to the FER research community is the major profile being given to corporate social and environmental issues, impacts and disclosure by governments, communities and media around the globe. How much longer can the majority of the FER research community continue to ignore these major ecological, social and political developments?

6. Collegial reflections

As outlined in the paper's introduction, 12 UK accounting professors were interviewed with respect to their assessments of the state of FER research and its trends. These interviews took the form of semi-structured dialogical interviews conducted in person or per telephone, during which the researcher and interviewees explored and developed a discourse between them on the focal issues suggested by the researcher (Glesne, 1999; Fontana and Frey, 2000; Flick, 2002). What follows is an exploration of major issues relating to FER research that is informed by the researcher's analysis of and reflection upon the professors' inputs.

6.1. *Through the finance lens*

Economics-based finance has had major impact on contemporary FER research, with the economic finance-based markets lens arguably constituting the 'mainstream' FER research preoccupation. This has manifested itself in forms such as modelling cause-effect relationships between accounting information/policies and stock prices, accounting standards impacts on financial markets and the value of the firm, events studies, and an increasing colonisation of the field by econometric inspired mathematical and statistical analysis. The focus is upon wealth maximisation and risk management. Markets have become regarded as the central game: unchangeable and unchallengeable. Despite market anomalies, investors' irrationalities, and the interplay of a range of societal constituents, many FER models remain tied to an artificial, economic, positivist view of the world and, despite some nuancing of the efficient markets beliefs through behavioural analyses, largely unchanged. While some criticisms of FER practice

arguably led to quantitative approaches to studying reporting phenomena and their causes, the approach has persisted in its focus upon studying what FER is, rather than what it ought to be like.

The primary sources of this finance impact appear to be the mimicking of North American positivist FER research which is dominated by the finance lens, and the migration of economists, econometricians and economics-based finance doctorates into business schools and accounting and finance departments. This influence has been accentuated by editors and referees for accounting research journals acting as gatekeepers who can oftentimes require adherence to finance-based FER research questions, designs and papers as a minimum passport towards being considered for publication. It has also attracted researchers with access to and enamoured of large database research, which allows them to capitalise on their training and the efficiencies of trawling through familiar databases. The focus on finance-driven FER issues rather than accounting-focused issues, may to some extent reflect the presence of increasing numbers of FER researchers who have strong finance training and much less familiarity with accounting theory, method and practice.

What have been the observed outcomes of these trends? While finance-based FER research has remained focused on retrospectively trying to make sense of what FER is and has been, the policy related ground of trying to define what forms it can, will and should take has received much less attention of late. As one professor put it, 'FER researchers have a trainset vision with levers that they repeatedly pull. They don't look for interesting sidings or new levers, and they don't go looking at actual trains. So their research is abstracted from what's happening on the ground.' Or as another professor commented, 'While mathematical models and studies may be statistically valid, they may not be socially important.' So FER research in many cases may be missing the 'big picture': vacating the accounting standards, policy and practice ground. What concerns some accounting professors is that the finance theories tend to seduce researchers into believing that markets are 'correct' and not to be challenged. Accounting becomes redirected into attempting to comply with and shape itself to conform with market reactions. This may to some degree reflect a compliance-based approach to accounting teaching becoming reflected in a compliance oriented approach to accounting research. Thus we may be developing, as one professor argued, 'a market for information addicts', with accounting being used as fodder for what are largely finance-based studies of markets.

In the meantime major issues of FER policy, standards development, accounting system critiques, and broader societal reporting requirements appear to be taking second-class seats in the train.

6.2. *Current dominant research issues*

Professors' views on the issues currently dominating FER research were largely consistent with their views on the finance orientation discussed above. The research agenda appears to remain locked into a strongly technicist orientation, including market impacts of accounting disclosures and standards, a continuing preoccupation with modelling large firm behaviour, and a significant representation of international accounting research.⁴ The latter has become manifest in attention to International Financial Reporting Standards (IFRS), which one professor referred to as 'the MacDonaldisation of accounting'. Others raised research questions such as the degree and desirability of international accounting standards being oriented towards the requirements of the powerful: large investors and creditors, to the exclusion of other constituents. They also remarked on the likelihood of FER researchers waiting to pick over the bones after the event: that is, studying the impact of IFRS several years after their introduction, rather than researching and contributing to the reporting methodology and frameworks before the event, and examining the forces driving FER globalisation as they occur.

From a corporate governance perspective, the major corporate crashes such as Enron are regarded as having triggered at least some concerns regarding financial reporting by FER researchers from across the finance and critical perspectives. Some professors, however, observed that for most finance-based researchers, it is 'business as usual', with FER researchers operating from other paradigms being left to reflect and critique accounting policy and practice implications; particularly concerning the reporting of and corporate accountability for directors' and senior managements' remuneration, share options and golden handshakes. Associated issues of corporate and professional ethics, the role of audit, and some degree of increased interest in corporate information and reporting design processes occurring within organisations have also been involved in this reflection and critique.

Other FER-related areas observed as attracting greater interest among UK researchers include social and environmental accountability and reporting, FER for non-profit/non-government and small to medium-sized organisations, as well as PFI and private-public partnership reporting in the public sector.

5.3. *The methodological toolkit*

As discussed above, the FER methodological

⁴ Notably international accounting research has not followed an exclusively markets-based research orientation.

toolkit is seen to be dominated by statistical and mathematical modelling, positivist market event studies, and finance-oriented use of accounting data.⁵ These approaches are arguably influencing the way in which researchers construct their definitions of the very problems they try to solve: problems being redefined to fit the tools that FER researchers prefer to employ. In addition, professors argued that much of this research is little read by accounting researchers, students or professionals, particularly given the mathematical and statistical languages employed. Again, the FER research community may be risking an incestuous dialogue with itself!

Professors pointed to the need for greater FER research efforts employing case and field research methodologies to provide access to longitudinal, processual data, and for generating policy/practice relevant theories and questions for larger scale empirical studies. They also called for a greater spectrum of methodologies including interpretive qualitative analyses, interview methods, critical theories' application, and sociologically derived perspectives that facilitate a broader, more critical set of assumptions than the economics-finance stream currently entertains.

With reference to the earlier discussion of the drivers of the finance-oriented FER research, a number of professors returned to the theme of journal influence upon FER researcher methodological choices. In this respect, the privileging of North American journals in many UK business schools and accounting and finance departments, induces the design of FER research projects and objectives to fit the positivist finance methodologies preferred by North American accounting and finance research journals. In this sense, the cart may well be pushing the horse!

6.4. *Neglected urchins?*

While it is academically comfortable and customary to critique what is being done, the question of absences and vacant spaces deserves attention, since moving future FER research focus and trajectory is at least partly reliant upon identifying those areas and issues awaiting the glare of the research spotlight. Some identifiable areas are reflected in issues covered in the above discussion. They include further research into the impacts of globalised accounting standards application, particularly in countries with developing economies and non-western national and ethnic cultures. They also include calls for even greater attention by FER researchers to social and environmental reporting, accountability and FER for enhanced corporate governance, and a greater quantum of

insider investigation into accounting and reporting design and production processes and related internal organisational reporting practice decision-making. Also seen as deserving a higher place on the FER research agenda are the potentially unique contexts and requirements for accountability and reporting by non-government, non-profit organisations, corporate watch groups and lobby groups developing counter-information on corporate performance and impacts, as well as the processes through which accounting standards are negotiated and regulated.

Given the massive developments in communication, and particularly electronic communication within societies worldwide, the modes and effectiveness of accounting communication and presentation, and the vistas, opportunities and problems opened up through internet reporting are observed to be curiously neglected by the FER research community. Related to these are issues of reporting to and report usage by groups such as employees, small investors, financial analysts, investment trusts, environmental and community groups and government regulators. Specific (and arguably more technicist) accounting issues awaiting further attention are seen to include accounting and reporting for goodwill and intangibles generally, intellectual capital, internal/external reporting linkages, and issues relating to corporate governance such as the appropriate length of the reporting period, the feasibility of audits for increasingly complex organisations, the adequacy of accounting's representation of complex operations, and the relationship between standards of accountability and trust.

Professors interviewed also pointed to an even broader canvas. The question was raised as to whether both agency and stakeholder theory perspectives have stagnated in their general usefulness and insights for many FER studies. Opportunities for greater application of social theory lenses, research grounded in inductively generated theory, sociological and ethics theories, and 'bigger picture' theories are all seen as available. At the same time, there is a call for broader narratives that engage FER with public policy, reporting beyond minimum legal or standards compliance, and developing reporting frameworks that can return the FER focus from a rules to a principles orientation.

6.5. *Into the unknown*

Professors interviewed were asked what they considered to still be the 'big unknowns' in the FER field. Their responses coalesced around a number of themes. Consistent with Hines' critique, many identified lacunae with respect to normative policy questions about what ought to be (rather than the current preoccupation with 'what is'). How well do company accounts reflect what is re-

⁵ Much like social scientists can sometimes employ historical data in a decontextualised, ahistorical manner.

ally going on in companies? Why do we persist with current reporting structures and routines, despite their publicly identified limitations? To which stakeholders should organisations really report and how? What areas of information not currently covered in annual reports should be accounted for and disclosed? The latter raises the issue of broader scope reporting. Is there room for alternative forms of reporting reports for specific groups or communities and addressing specific issues such as intellectual capital, social and environmental impact, counter-reports on organisations, and more?

Have we yet learned all we can about the inside workings of accounting policy formation processes? While there have been well-researched efforts in accounting standards lobbying research, we still lack insider interview, field study-based processual research that penetrates policy deliberations, negotiations, influences, rationales and decisions.

Interviewed professors also called for a return to fundamental questions of what would be useful in report disclosures and to whom? What do report producers intend? Who are they targeting? How do organisational constituents and communities really perceive FER? How is reported information used and why? To what extent is it trusted or relied upon? Which groups read reports? What do they read, why, and what do they learn? Does it matter if no-one reads them? Have analysts' briefing meetings supplanted formal external reports to all intents and purposes? Is the FER act of public accountability sufficient in itself? In many respects, these are also processual questions which FER researchers once considered, but of late have tended to neglect. They require direct researcher engagement in the field. Desk research alone cannot penetrate these issues in practice.

Again on a corporate governance theme, accounting professors raised the issue of FER's attempts to portray a snapshot of financial performance and status of increasingly complex organisational structures and operations: questioning just how achievable this really is! As reporting frameworks attempt to cope with more and more organisational and environmental complexities and uncertainties, does their credibility come under greater threat as they attempt to capture a host of uncertainties in a turbulent post-modern world? Continuing crashes of major companies internationally suggest otherwise. Are accountants complicit in presenting images of orderly markets and organisations under control, when in fact they are spinning out of control? How do we grapple with the interrelated technical and ethical

reporting and competency issues involved?

6.6. *Some failing grades*

So where and in what respects have today's FER research community failed? While such a question predisposes interviewees to a strong critique, we arguably have more to learn from its application. The interviewed professors were notably expansive on this question. The themes can be summarised as a narrow theoretical and technicist focus, practice engagement, and critique of the status quo.

Many FER researchers can be criticised for their adherence to one theoretical perspective, so that research tends to be confined to a particular economic or sociological or critical theory, ignoring opportunities to bridge these theoretical divides and draw on interrelationships and cross-fertilisations that may be on offer. In addition, the various positivist, qualitative and critical researcher groups are argued to be reading each other less and less, thereby accentuating the divide between research traditions and their knowledge sets. This narrowness has been accentuated by positivist researchers' tendency to go in search of problems amenable to their own specialist toolkit: solutions in search of problems to solve. This has had the consequence of FER areas and issues being researched becoming less and less policy-oriented and relevant and becoming increasingly smaller in focus and scope. Context and complexity risk being sterilised from the discourse. This constitutes a general failure to address the social, institutional and political world that FER inhabits. Modelling and theorising continue apace, regardless of their glaring limitations and remoteness from accounting policy and practice. The bigger societal, policy questions⁶ of major potential future impact upon business, governments, communities and the accounting profession are largely ignored by the majority of FER researchers.

Professors interviewed voiced strong criticisms of FER researchers' failure to directly engage with corporate and professional practice in several respects: researching actual live or historical organisational, business and professional cases, pursuing direct involvement in professional and business associations, focusing on actual accounting and business practices, and directly interrogating and observing decision-makers.⁷ By failing to directly address decision-makers, FER researchers are seen at risk of failing to understand those people's perspectives and problems, and thereby produce findings only of interest and relevance to a small group of fellow researchers using their material for similarly abstract research. Greater attention to these aspects has the capacity to refocus FER researchers on the bigger picture policy issues of today.

Underpinning all the above is an observed gen-

⁶ For example, corporate and accounting fraud and failure, environmental sustainability, accounting for intellectual capital.

⁷ Including policymakers, report producers, report audiences, and regulators.

eral failure among many FER researchers to question and challenge conventional wisdom concerning corporate accountability and external reporting, preferring instead to pursue incremental studies of highly specific technical procedures and behaviours in artificially contrived modelling scenarios. Current practices and policies are thereby taken for granted, 'explained' and legitimised.

Professors again attributed such failures to characteristics and behaviours of the accounting research community. These include researchers becoming wedded to particular methodological skills and databases they have acquired, continuing with additional research projects that keep their strand of research alive, regardless of its business or societal significance.⁸ Researchers were observed by one professor to 'hunt in packs': spotting publishable topics, theories and methodologies being welcomed by targeted journals, and joining the pack of researchers in search of ready acceptance by journal editors, and leaving other important issues and fields unvisited. The insufficiently addressed need for processual research is seen as time-consuming and more difficult to publish in an RAE world of time pressures and top journal 'scores'. Research publication itself has become a qualifying, badging mechanism for academics' marketability, so that the nature and importance of the problems or questions addressed matters less than the number of papers published in prestigious journals. The ultimate failure lies in accounting research becoming an end in itself.

6.7. *The FER – corporate governance schema*

Corporate governance is now addressed across many different research literatures: management, information systems, marketing, finance and accounting. While one or two professors saw corporate governance as a somewhat elastic topic which currently was experiencing a bandwagon effect among both professionals and researchers, the vast majority of interviewed professors saw significant and wide-ranging relationships between FER and corporate governance. The range extends from research into FER's role in enhancing shareholder value to its potential for improving social and environmental reporting. Their views on the corporate governance schema reflected the analysis of unknowns and failures presented above.

A corporate governance perspective on FER however, is valued as a means for raising and addressing the big questions:

- What types of information can and should accountants produce for corporate governance purposes?

- To whom are organisations and the accounting profession accountable and to what extent?
- What scope of information should be provided to meet *society's* requirements for responsible corporate governance?
- What will be the accounting profession's FER roles and responsibilities in the post-Enron and Sarbanes-Oxley world?
- How shall we define and address the public interest dimensions of FER in the future?

In addition to addressing such major questions, FER research faces an agenda-balancing challenge. This is a matter of the proper treatment and balance of meeting the accounting responsibilities for ensuring transparency and accountability, while at the same time assisting with the assessment and management of risk by all organisational and societal constituents. Such issues immediately refocus us upon questions of ethics. As one professor put it, we need a fundamental re-examination of the accounting profession's FER role, including corporate and accounting profession self-interest, public interest, and relationships with the investing community, the community at large and the State. This remit goes well beyond focusing solely upon markets.

The FER view of corporate governance has at times arguably been too narrow: again focusing upon markets and large investor reactions. The challenge is far beyond these. The use (or non-use) of and approaches to FER by boards of directors and audit committees needs processual field research. Compared to the corporate private sector, we know even less about FER – corporate governance relationships and processes inside non-profit organisations. There is also a question as to why public sector organisation developments in developing and reporting efficiency and effectiveness key performance indicators has not been mirrored in the private sector? It has barely been considered. The current and potential roles of large institutional investors⁹ in the governance of corporates in which they have a major stake, and their role in FER production and use within such corporates also begs for a well-developed stream of qualitative research that investigates what they do, how they do it and why. As one professor summarised this picture: 'Corporate governance can be a unifying framework to bring all this together.' This was echoed by others who saw the potential for framing accounting policy debate and development within a corporate governance perspective, who advocated the recognition of a broader constituency (than simply investors) which FER should address within a corporate governance context, and who argued for a broadening of researchers' attention to FER's corporate governance

⁸ Or insignificance!

⁹ Including investment trusts, hedge funds, pension funds, trade associations.

role in a civic society.

As some were moved to observe, we need to find out much more about what is really going on. We need to talk directly to the full range of FER constituents: producers, recipients, targets and third parties. We need to find out much more about their motivations, reactions, behaviours and requirements. We need to better understand the processes and impacts of the full range of organisational accountabilities being demanded by investors, advisors, employees, creditors, communities and governments. We need to pay equal attention to FER in the private, public and third¹⁰ sectors. We need to better understand the patterns of and intents behind voluntary versus compliance FER. In summary, we need far deeper understandings and critiques of the processes of FER in corporate governance, the drivers, and the hidden as well as manifest agendas.

7. Towards a research policy agenda

A number of observations can be made and implications drawn from the findings reported in this study. There is a strong argument to suggest that FER is a socially constructed phenomenon purporting to operate in and represent a social, political, institutional as well as economic world. What FER researchers choose to focus upon, and via what means, begins to socially construct how others will see their world and what they will see to be its significant issues and problems. So both researchers and professional accountants play a significant role in constructing others' perceived realities: a significant responsibility.

Accounting research publishing studies, FER research subject area reviews and interviews with leading FER researchers all consistently observe a finance-driven, economics-based, markets focus in a large proportion of contemporary FER research. The preoccupation is one of modelling predictive relationships between inputs and outputs in search of maximising value to the investor. The economic market is a 'given' and accounting aims to adjust and service accordingly. This presents a worldview that is almost exclusively economic. Social, institutional and political context are sterilised out of the picture in favour of an abstract, existentialist portrait. This dramatically changes the way both researchers, accountants, and FER audiences will see their world. It potentially corrupts both business and societal perception and behaviour, with potentially long-term dysfunctional consequences for society and its institutions.

In focusing obsessively upon mathematical and statistical representations of 'what is', the FER research community faces a number of significant

risks. First, it may be applying comfortably familiar tools to examine well-worn topics and questions that are becoming smaller, narrower and less significant over time. Second, it may be reifying a private language accessible only to insiders and believers within particular theoretical and methodological clubs. As such, its research will become self-referential, read by no 'outsiders' and only used as a scoring mechanism in the academic job market: the findings on offer mattering to no-one. Third, the present balance of business interests, and the ongoing history of corporate reporting manipulations, frauds and failures will remain accepted and unchallenged. Policy change will not come from the FER research community. They will remain as disinterested spectators on the sidelines, while others are left to play the main game.

The failure of many FER researchers to react to the environment around them is amply evidenced by the FER subject area research reviews examined in this study. Across the various subject areas examined, one common theme emerges. Oftentimes, the reviewers cited in this study have observed researchers to be persisting with traditionally pursued topics and research questions while apparently ignoring major shifts that have been occurring in the environment directly affecting their research subject area. For example, many capital markets and international accounting researchers have been observed to ignore or accept as a given, the predominantly westernised, large business-oriented globalisation of accounting standards. Its shape, orientation and impact on a wide diversity of countries, cultures and contexts, remains on the whole unquestioned. Intellectual capital accounting research still struggles for a place in the sun when most developed economies have evidenced a shift to predominantly service industries in which knowledge and human capital are the prime assets and value-drivers. Internet reporting and accounting communication research remain minority pursuits in the midst of a whirlwind of communications technology and associated human behaviour change. Social and environmental accounting research, despite promising signs of growth, remains ignored by 'traditional mainstream' researchers and journals despite a massive upsurge in national and international public debate, media attention, community concern, and government focus and regulation with respect to global warming, water and air pollution, and land degradation.

How and why has this happened? Again, accounting research commentators and interviewees reported in this study converge on some of the explanations. They cite the types of doctoral training being provided as locking new scholars into methodological strait-jackets, predefining problems to fit the preferred tools available and pre-

¹⁰ i.e. voluntary non-profit.

cluding the 'bigger picture', the 'larger questions'. They cite the tendency of North American research to be increasingly colonising business school and academic accounting community views on what are acceptable research problems, methodologies and publication venues. They cite the combination of RAE or other national government measurement and timing pressures which predispose researchers to construct 'neat' projects amenable to time-efficient data collection and analysis, and high publication probability in highly-ranked North American¹¹ journals.

What is the alternative? This study argues that we must return to the empty spaces and silences in our discipline. We need to re-engage directly with the full spectrum of FER constituents. We have much to learn from investigating the processes that take place in what the modellers treat as a black box. Corporate governance is both an issue of great community concern and a great opportunity for FER research, particularly in the wide-ranging scope and integrative framework it offers as a basis for redirecting our focus to the major corporate governance issues and responsibilities of our day. Some 'old' questions resurface as deserving serious revisiting by the FER research community: What is to be the FER role in this dramatically changing, globalised, high-technology world? What types and scope of information are required? What will be the accounting profession's roles and responsibilities in an increasingly complex and fast-changing organisational, economic, social, institutional and international environment? These are clearly the 'big' questions of the day. The vital question is whether the FER research community has the ability and willingness to engage them?

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Financial and external reporting research: the broadening corporate governance challenge

A comment

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Professor Parker raises some important issues concerning the shortcomings of, and major issues ignored or inadequately addressed by, mainstream research into what he calls Financial and External Reporting (FER). My concern is that because of the way he chooses to raise these issues, he may find himself largely preaching to the converted. For his critique of mainstream FER research is not merely polemical in tone, but is lacking in philosophical or historical perspectives, and his proposals for re-orientating FER research overlook some key issues of research training and theory development. One could expect a more balanced, yet still critical, appraisal taking account of such perspectives and issues to be more persuasive, and hence more likely to provide the impetus for re-orientating FER research which Parker seeks.

In this comment, I seek to contribute to such an appraisal by giving emphasis to these historical and philosophical perspectives and issues. I start by considering mainstream FER, and Parker's critique of it, from an historical perspective with attention to philosophical issues, notably the ontological issue of *realism*. I then examine Parker's proposals for re-orientating FER research around issues of corporate governance. While proposing corporate governance as a focal set of issues for FER research is an excellent idea, it can be seen that Parker's proposals not merely beg some important questions but do not even constitute an outline of a strategy for moving FER research forward.

Parker's critique of mainstream FER research

The methodological and epistemological characteristics of mainstream FER research are rarely made explicit in the research publications. The

book by Watts and Zimmerman (1986) which reviewed a considerable number of such publications was entitled *Positive Accounting Theory*. One might infer from this that one of those characteristics is positivism. However, consulting philosophical dictionaries gives no very clear idea of what 'positivism' is. Some historical context is required in order to understand the relevant sense of the word. In FER, the term 'positivism' may be suggested by the desire of FER researchers to *move away from* the attempts in the 1950s and 1960s (perceived as fruitless) to develop a body of *normative* accounting theory (NAT) as a basis for the setting of rules or 'principles' for financial accounting, and to examine FER *empirically* as a set of socio-economic phenomena. This desire started to manifest itself in FER in the late 1960s and early 1970s, with what I have termed the 'empirical turn' in financial accounting research (Archer, 1993, 1998). The year 1972 saw the publication by the American Accounting Association of the *Statement of Accounting Theory and Theory Acceptance*, which concluded that there could be no 'theory closure' in NAT.

The 'turn to empiricism' might be described as *positivist* both in the sense that it did not seek to lead directly to *normative* conclusions (e.g. regarding rules or 'principles' of financial accounting), and in its 'emphasis on quantitative data and precisely formulated theories' (Kincaid, 2000). According to Parker, this research was characterised ontologically by external realism, researching 'what is' in a world 'out there', while (as Hines, 1988, suggests) the researchers in question were participating in the reification and legitimisation of a capitalist status quo in which the logic of markets goes unchallenged. This is debatable, to say the least, and such ideologically-based objections to the research in question may miss an important point concerning the ontological standpoint, not of FER researchers, but of an arguably more influential group, namely the finan-

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cial accounting standard-setters, issuers of the US Financial Accounting Standards Board's Statements of Financial Accounting Concepts and of the UK Accounting Standards Board's Statement of Principles, who indeed take an external realist view of 'economic reality' and 'representational faithfulness' (Archer, 1997).

The ontological standpoint of external realism may be criticised from perspectives other than that of social constructionism; for example, from that of *internal realism* as proposed by Hilary Putnam (Putnam, 1981; Alexander and Archer, 2003). Moreover, criticisms regarding the reification and legitimisation of a capitalist status quo would be better directed at the endeavours of professional accounting bodies to produce conceptual frameworks for external financial reporting (which are in fact a form of NAT) rather than at empirical researchers.

What can be fairly said of the latter, however, is (as Parker notes) that the 'precisely formulated theories' used in such research have been almost exclusively drawn from neo-classical microeconomics, and the quantitative data have predominantly been secondary data obtained from the large electronic databases of share prices and financial statements that began to be available in the late 1960s. It is these latter characteristics that Parker seems to find so objectionable. But this is not a problem of *positivism* as such. A positivistic approach can be adopted using, for example, theories from the sociology of organisations, as in the organisation theory discussed and defended by Donaldson (1985). Moreover, such an approach does not imply the use of secondary data only. What Parker seems to be objecting to in mainstream FER research is not positivism as such (although he uses the word as a term of abuse), but rather *economism* (the tendency to reduce all social science to economics) and *external realism* (the ontological position of envisaging reality 'separately from thought, language and social practices').

However, it is not clear that the researchers in question have any commitment (ontological or methodological) to external realism, or indeed to economism. What is undeniable is that a combination of theories from microeconomics and data from large electronic databases provided a very convenient (and arguably quite fruitful) basis for the 'empirical turn' in FER research. One consequence of this has been a lack of training of would-be FER researchers in other social science disciplines (such as sociology and social psychology) and research techniques (such as case studies) that might permit a different set of questions about PER to be addressed, as well as some questions raised but not answered by the existing mainstream research. While this lacuna in research

training is indeed regrettable, such regrets are not a justification for the kind of hostility towards capital markets-based and similar FER research of a 'North American' variety that we find expressed in Parker's critique.

Social constructionists dismiss such research on certain philosophical (mainly ontological) grounds which imply that its type of empiricist approach is inappropriate. But one does not need to be any kind of a social constructionist to take the view that the nomologically-oriented empiricism characteristic of research in the natural sciences is inappropriate in social science research of which FER research is a part. For example, Ravetz (1971, ch. 14), surely no social constructionist, also warns of the problems that arise when researchers in a field that 'attempt[s] to study human behaviour [adopt] ... the style of the mathematical-experimental natural sciences'.

Most mainstream FER research is nomologically-oriented only to the extent that the neoclassical microeconomics which provides its theoretical background aims to be a basis for empirical generalisations and, thereby, predictions. The researchers are seeking, among other things, an understanding of the empirical properties of FER disclosures as information to actors in capital markets. While a search for a reliable basis for predictions in the social sciences would be vain (Bohman, 1991), such an understanding may contribute to a broader set of understandings of 'what is', surely a prerequisite for effective critique leading to prescriptions as to 'what should be', although such prescriptions cannot have a nomological basis. Thus, as Gergen (1998) suggests, rather than pursuing endless methodological, epistemological and ontological controversies and mutual disparagement, it might be better if social constructionists and those of 'realist' persuasions – including 'internal realists' who are perfectly aware that 'economic reality' is an intersubjective construction involving collective intentionality (Alexander and Archer, 2003) – were to consider both constructionism and realism as 'forms of discourse ... as different cultural resources ... available to all of us for situated purposes' (Gergen, op. cit. 151–155).

A more telling criticism of the mainstream FER research programme would be that, like most researchers in any field, its adherents pay little or no attention to fundamental issues of methodology and epistemology in social science research, as opposed to (statistical) *method* and related research design issues. Parker might therefore, in his subsection 6.3, have presented a more fundamental methodological and epistemological criticism of much mainstream FER research – not its 'positivism' or its 'economism' or its 'narrow technicist focus' or even its frequently inconclusive charac-

ter, but the *reasons* for such inconclusiveness, namely their 'materials which should, but do not, achieve [the] status [of facts]: the conclusions of arguments and the evidence, information, and data on which they are based. The failure of nearly all of these to survive, even in the short run, is an indication that most of the work of investigating problems is vitiated by pitfalls The mechanisms for the processing of results, and for the exercise of quality control, cannot be stronger than the materials on which they operate. For social reasons it is necessary to give the formal authenticity of publication to masses of results that are very weak' (Ravetz, op. cit.: 369–371).

Writing in 1971, Ravetz left open the question of whether the social sciences could ever progress beyond what he characterised as their 'immaturity'. Twenty years later, Bohman (1991) was quite clear that the 'new philosophy of social science', recognising the problem of indeterminacy that results from the reflexivity and intentionality of social action, rules out the possibility of nomological theory development in the social sciences. Yet the so-called 'methodology' courses offered to post-graduate students in accounting largely confuse methodology and method and focus almost exclusively on the latter. Parker does not address the issue of research training (already mentioned above) in his polemic against mainstream FER research, beyond lamenting that the mainstream approach tends to reproduce itself. But of course it will, until the 'turn to empiricism' is succeeded by an alternative research programme that succeeds in attracting the necessary resources – a *successful* 'turn' to a post-empiricist research programme as sought by Parker. But what kind of blueprint (or basis for one) does Parker give us for such a 'turn'?

Parker's proposals for re-orientating FER research

While he does not address the issue of research training, Parker looks to a corporate governance (CG) perspective on FER 'as a means for raising and addressing the big questions'. He lists five of these:

1. What types of information can and should accountants produce for CG purposes?
2. To whom are organisations and the accounting profession accountable and to what extent?
3. What scope of information should be provided to meet *society's* requirements for responsible corporate governance?
4. What will be the accounting profession's FER roles and responsibilities in the post Enron and Sarbanes-Oxley world?
5. How shall we define and address the public interest dimensions of FER in the future?

He later adds, in his concluding section, three further questions that largely overlap with those above, and which he describes as 'clearly the "big" questions of the day':

- What is to be the FER role in a dramatically changing globalised, high technology world?
- What types and scope of information are required?
- What will be the accounting profession's roles and responsibilities in an increasingly complex and fast changing organisational, economic, social and institutional environment?

The wording of these questions raises a number of problems. For example, which organisations does he have in mind in question 2, and is the accounting *profession* as such *accountable*? Is this the same as accountants having *professional obligations* to a wider public than their clients? Does *society* as such have '*requirements* for responsible CG'? Is that the same as saying that there is a need for responsible CG in the type of society in which we live (and that this need implies a further need for certain kinds of information to be made available by managements of corporate entities to their stakeholders)? Two major issues in CG are: who are to count as the stakeholders in a given corporation, and what are their rights as stakeholders?

But beyond that, I would ask two further questions: (a) what social science knowledge base and research skills would be relevant to addressing these and similar questions with a reasonable degree of competence? (b) how are such competences to be developed? With regard to CG, such a knowledge base should arguably include *jurisprudence* (Archer, 1993).

In Parker's concluding section, one looks in vain for any kind of answer to these last two questions. He tells us what we should avoid doing, but not how we might set about doing differently with any hope of success. In other words, Parker sets out a 'wish list' of research questions but no strategy for getting answers to them, except for the reference to 'a well-developed stream of qualitative research' and the 'need to find out much more about what is really going on' (although he also criticises mainstream FER research for paying too much attention to "what is" questions at the expense of questions about 'what it ought to be like'). The implied strategy could thus perhaps be taken to involve exploratory research that is not at all theory-driven. But how are we to recognise and make sense of 'what is really going on'? Surely in order 'to better understand the processes and impacts of the full range of organisational accountabilities being demanded by investors, advisors, employees, creditors, communities and governments', one thing that is needed is an invest-

ment in relevant theory to guide the research (Yin, 1994, warns of the limitations of case-based research undertaken without adequate theoretical motivation; but maybe Parker would dismiss Yin as a *positivist*). Yet there is no mention of any theoretical basis.

Management accounting researchers typically employ case-based, processually-focussed research approaches of the kind apparently sought by Parker for FER, and have invested (e.g. to obtain their PhD) in a knowledge of organisation theory and other relevant branches of sociology and social psychology. Research into 'management accounting'-type areas includes such topics as the operation of control systems within organisations, and these happen to have significant CG implications. So one possible strategy would be to foster collaboration between FER researchers and management accounting researchers on CG topics. But Parker does not mention such a possibility, even to explain why he thinks that it would not be successful.

Given his failure to address questions (a) and (b) above, I am left wondering whether Parker's version of social constructionism is of the 'anything goes' variety (Brown et al. 1998, ch. 6) which does not recognise any need for an investment in relevant theory development. In any event, the social constructionist position that he adopts in his paper seems to provide neither an effective critique of mainstream FER research nor the basis of a blueprint for re-orientating it with a focus on CG.

But a more positive (not positivist!) understanding of what Parker may be seeking is possible. The title of my inaugural lecture at the University of Surrey in 1995 was 'Pedants or gurus: the production and dissemination of knowledge in the management disciplines' (see Archer, 1998). Gurus rely on *wisdom* and personal insights rather than on knowledge in the scientific sense, and their pronouncements have the character of aphorisms, expressions of a deep personal understanding of the objects of study, rather than impersonal scientific

assertions (Ravetz, op. cit.: 375). Possibly, Parker is asking for FER researchers to be like wise 'gurus', rather than 'pedants' concerned with such matters as the precise theoretical basis of their research. No doubt gurus are (if genuine) indeed preferable to pedants in social science research (including FER research); the problem is that genuine gurus are also in very short supply.¹ Quack gurus tend to be more readily available, and even pedants may be preferable to them!

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¹ One genuine 'guru' for FER whom I have known personally was the late Professor Eddie Stamp, a colleague at Lancaster University. Eddie had a major impact on the UK accounting profession, being the driving force behind the setting up of the Accounting Standards Steering Committee, and the *rapporteur* who effectively wrote its 1975 publication *The Corporate Report*, a far-sighted document as regards corporate governance which was unfortunately overshadowed by the Sandilands Report published in the same year.

Financial and external reporting research: the broadening corporate governance challenge

A reply

Lee D. Parker*

Professor Archer's commentary on my findings and arguments presented in the paper 'Financial and external reporting research: the broadening corporate governance challenge', represents what I hope will be the beginning of reflection and debate that the paper is designed to stimulate. His contribution is welcome and immediately illuminates the issues facing financial and external reporting research (FER). Rather than descending into an abstract and microscopic scholarly debate over fine points, I shall confine my responses to what I consider to be the larger issues that my original paper is designed to challenge. While Simon sought 'a more fundamental methodological and epistemological criticism of much mainstream FER research', such was not the focus and primary intention of my paper. It represents another potential paper that deserves writing and which I hope that he indeed will write. For such further reflections and critiques in the FER field are exactly what I am seeking to stimulate.

As Simon correctly observes, my approach has been deliberately polemical and critical. His preference for what he describes as a more balanced approach, reminds me of the recently failed diplomatic attempts by major nations to dissuade North Korea from nuclear weapons development and testing. As an interpretive qualitative and critical researcher, I choose to challenge and provoke debate in the (faint?) hope of triggering some greater level of response self-critique in the otherwise sleeping giant, the FER research community.

There is much upon which Simon and I agree. Indeed, while we could easily slip into a lengthy (but probably unproductive) debate about our differing theoretical and methodological standpoints, in terms of our observations of extant FER published research, we are in fact closer than might

first appear. For example, I suspect that we may find ourselves in agreement that many FER researchers have moved away from concerns with normative accounting issues, and therefore by implication lack direct interest in contributing to policy and practice development. However Simon does attempt an apologia in arguing that the search for the Holy Grail, namely reliable predictions for capital markets' actors, is a prerequisite for effective critique and prescriptions of what ought to be. This bears all the hallmarks of Tony Blair's and George Bush's attempts to produce new justifications for their invasion of Iraq, once weapons of mass destruction could not be found. As an eclectic, non-doctrinaire scholar, I would welcome the positivist economic and capital markets contribution to the search for improved FER and corporate governance policy and practice. However, at the same time I would argue that it is severely limited in the level of contribution it can make to what after all are deep questions of process, context, societal values and more. For addressing these complex and multidimensional features of the world we inhabit, we need multiple theories, methodologies and methods that embrace complexity and grapple with it, rather than vainly attempting to abstract from it and simplify it.

Simon and I concur that FER's existentialism can be critiqued from more than one theoretical perspective. Indeed we can incrementally learn from the application of more than one of these to such issues. To assist the reader in interpreting my study's observations and findings, I have therefore deliberately declared my social constructionist perspective, particularly informed by the writings of Hines (1988, 1989a,b, 1991, 1992) and Laughlin (1977, 1981, 1987, 1995, 2004). I make no claim that this is the only productive perspective from which FER research can be examined and critiqued. What I *do* claim is that this perspective offers one alternative path to illuminating and unpacking some of the otherwise opaque trends

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and drivers in contemporary FER research.

I am delighted to find that Simon and I also agree that much FER research is database-driven (rather than policy or practice issue driven). Simon would lure me into debating the fine points of distinction between whether this is a problem of positivism, economism, or existentialism. I have no interest in making such a distinction. I regard all three as complicit in the failure of FER research. This potent combination has dominated the contemporary approach to FER internationally. An entire paper could easily be devoted to elucidating their complicity in this regard.

Yet again Simon and I concur in our attribution of the bias in research training provided to accounting doctoral students and scholars, as being a primary driver of the narrow, marginally policy-relevant, failed FER research now largely being published in refereed journals around the world. We diverge, however, in Simon's attempt to excuse North American dominated capital markets research from culpability. The configuration of the large proportion of published FER papers within this paradigm, as already reported by such studies as Beattie (2005) and Searcy and Mentzer (2003) makes this culpability self-evident. In suggesting ways forward, Simon is absolutely correct however in pointing to the need for a greater elucidation of the type of research training that should be offered in our discipline. I admit that it is a somewhat simplistic response to suggest that the purely quantitative methods (rather than methodology) training delivered to research students should be supplanted by a greater range of methodology and methods education in the qualitative, critical, and interdisciplinary traditions. Their further exploration by way of a postgraduate education agenda requires and merits a full paper that lies beyond the scope of what was achievable here.

Simon finds difficulty with some of the further research agenda questions that my interviewees and I offered for FER. The definitional, wording and scope problems to which he refers are all fair and important questions. I embrace them all! They demonstrate the value of my raising criticisms and further research questions which then stimulate introspection, debate, refinement and hopefully broader horizons of enquiry at the policy and societal levels. He wonders why I did not address a rapprochement between management accounting, with its greater tradition of multidisciplinary and qualitative research, and financial accounting. I agree with him that this may be a way forward in influencing the FER research agenda, but in all probability it will present but one of an array of strategies that will be required if any significant cultural change is to be implemented in our accounting research community.

Where Simon and I really do part company, is in

his wish for all research to be theory driven. He reflects his positivist tradition in seeking neat prescriptions for how to find answers to the research agenda questions my paper raises. This smacks of the FER researcher's preference for neat methods and even neater solutions. The qualitative field researcher, for example, directly engages the world of the actors and knows how messy and complex that world is. To that end, all manner of approaches can be employed, from inductive interpretive research, to multi-method inquiry, to macro-theory driven revisitations and more. As Simon suspects, I would certainly classify Yin's (1994) approach as a North American positivist version. One must turn more to the British and European traditions (though not exclusively) for a more sophisticated and deeply wrought approach to inductive and interpretive field-based case study and the qualitative tradition in general (McKinnon, 1988; Scapens, 1990; Ferreira and Merchant, 1992; Dawson, 1997). My paper's focus was to raise a new agenda of FER research questions and to suggest broad alternative approaches to enquiry. My message is quite the opposite to any prescription that risks 'strait-jacketing' research inquiry into some alternative unitary but similarly confining recipe-book approach so characterised by much contemporary FER research. For a completely alternative array of theoretical and methodological alternatives, I refer the reader to Llewellyn's (2003) award-winning seminal paper on levels of theorising in qualitative accounting and management research. This provides the comprehensive response to Simon's theory-driven concerns.

In summary, Simon and I clearly both share profound concerns with the current state and direction of FER research. Simon would prefer, at least at this stage, to focus our deliberations at the epistemological and ontological discourse level. There is value in this, and I welcome it. However my project and preferred level of engagement is different, and I believe, complementary. My project is about observing process and context, developing theory about this, and engaging in accounting policy and practice change for the betterment of corporate governance. Both of us deserve a place in the sun!

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Accountants in late 19th century Britain: a spatial, demographic and occupational profile

John Richard Edwards and Stephen P. Walker*

Abstract—Recurring difficulties over defining occupational and professional boundaries in British accountancy are best understood by examining historical variations in the emergence and status of the population of accountants. The study uses census enumerators' books for 1881 to construct a spatial, demographic and occupational profile of professional and non-professional accountants. It is shown that there were considerable geographical variations in the density of accountants. It is speculated that these variations reflected patterns in the feminisation of bookkeeping as well as socio-cultural differences in meanings of the title 'accountant', which were sustained by networks. Although accountants were most closely associated with commercial activity, the boundaries of the occupation remained obscure. The description 'accountant' embraced a multitude of employment statuses, the performance of diverse tasks and included specialist sub-occupations. Members of professional bodies comprised a small proportion of the total community of accountants in 1881. Further, there was a yawning divide between the status of professional and non-professional practitioners and there were also considerable variations in status within the chartered profession, between CAs in Scotland and England and Wales, and between the London elite and their lesser brethren in the provinces.

Key words: Accountants; census; feminisation; identity; nineteenth century

1. Introduction

In 1954 Nicholas Stacey observed: 'A peculiar characteristic of the development of the accountancy profession has been the formation of a disproportionately large number of different organisations for the pursuit of identical aims. This organisational development ... has resulted in much duplication and, still worse, in a fragmentation of professional strength' (259). Later students of the accountancy profession in the UK illustrate that problems of occupational definition have been central to understanding patterns of professionalisation and the emergence of problematical institutional configurations. Attempts to remedy the structure of the profession in the British Isles have often been frustrated by conflicts over the determination of the practitioners and organisations encompassed by merger schemes. The identification of the outer boundaries of the accounting profession in the context of incursions by unqualified

interlopers has likewise been a recurring concern. Like generations of previous observers, the Professional Oversight Board (2005:42) recently noted the problems emanating from the continuing presence of unqualified accountants in the occupational field.

Accounting historians have revealed that modern day attempts to reorganise the profession are complicated by the legacy of closure practices instituted by the chartered organisations formed during the 19th century (Shackleton and Walker, 1998, 2001; Walker, 2004b). Historically, organisational boundaries reflected spatial variations in sources of employment and the status of practitioners, as well as compromises over the determination of those included in and those excluded from accountancy bodies seeking the conferment of privileges by the state (Walker and Shackleton, 1998; Edwards et al., 2005). The close determination of the limits of professional accountancy by the early chartered bodies in Scotland and England and Wales encouraged subsequent proliferation of organisations, rendered integration attempts problematical and conditioned organisational politics through the 20th century (Stacey, 1954:134–149, 235–241, 259–261; Parker, 1986:14–15; Walker, 1995, 2004a; Matthews et al., 1998:58–69).

Given its significance to issues surrounding the structure of the contemporary accountancy profession, it is not surprising that historians have sought to illuminate the sources of differential status with-

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in the occupation. They have also attempted to augment understandings of the problems of boundary definition and closure which confronted those who organised the craft from the mid-19th century. It is increasingly recognised that exploring these themes requires extending the scope of historical studies to the occupational populace as a whole, beyond the memberships of the elite professional bodies (Loft, 1992; Cooper and Taylor, 2000) and a greater sensitivity to the potential importance of gender (Kirkham and Loft, 1993). Investigation of late 19th century bookkeepers, for example, has made visible the performance of accounting functions by women and suggested a revised chronology of their feminisation (Walker, 2003). A more holistic frame of reference may also provide deeper insights to other issues in the history of the occupation such as the changing complexion of accounting work and the delineation of inter-occupational jurisdictions.

Walker's (2002) study of the residential, occupational and social profile of accountants in three counties of England in 1851 showed that the boundaries of the occupation were poorly defined. The term 'accountant' embraced a wide range of occupational experiences and employment statuses and its meaning was subject to local variation. The results suggested that distinguishing the professional from the non-professional practitioner would be problematic for the accountancy bodies which formed in England during the 1870s. That study was based on source material of limited coverage – electronic versions of the census enumerators' books for Devonshire, Norfolk and Warwickshire. The availability of the transcribed 1881 census for the whole of Britain has since provided opportunities to pursue a more extensive analysis and to do so at a key moment in the history of professionalisation.

The ICAEW was formed in 1880, the year before the census, a time when the problem of boundary determination was particularly apparent. The complexities involved in organising the new professional organisation become clear when it is recalled that the 1881 census of England and Wales enumerated 11,606 accountants, 3,344 accountants are identifiable in city directories c. 1880 but the membership of the ICAEW in 1881 was only 568 (Edwards et al., 2005). The population of accountants from which the professional elite was drawn had also grown rapidly in recent decades, particularly as opportunities were opened in insolvency work (Walker, 2004a, 2004c). The 1861 census had reported 6,239 accountants in England and Wales. By 1871 9,832 were counted.

The object of this paper is to provide a spatial, demographic and occupational analysis of accountants in Britain in 1881 to illuminate the com-

plexities of defining the occupational populace and the professional community within – complexities which impacted on the professionalisation process and the shaping of institutional structures. The paper begins by discussing the sources used for the study. A spatial analysis of the distribution of accountants in 1881 is then presented at the level of region, county and local district. An attempt is made to offer explanations for the distributions observed. The small number of women accountants identified in the census is the subject of the next section. An analysis of the employment status, sectors and occupational identities of accountants in Britain in 1881 follows. Differences in the status of professional and non-professional accountants and variations within the profession itself are the subject of the final empirical section.

2. Sources

Decennial censuses of the British population commenced in 1801. From 1851 the information collected by the census authorities became more extensive and included greater detail about the occupation(s) pursued by individuals (Higgs, 1996:8; Nissel, 1987:61–63). The data source for the current study is the transcribed version of the proforma books completed by local census enumerators – the census enumerators' books (CEBs). These books were compiled from schedules distributed to householders in advance of census night, which, in 1881, was 3 April. The schedules were collected by the enumerators on 4 and 5 April and the details entered in CEBs. The books were processed by clerks in the Census Office in London and, following statistical analysis, the official reports of the count of the population were produced (Mills and Schürer, 1996; Drake, 1972:23–9; Tillott, 1972:129–33).

In 1999 the transcribed CEBs for 1881 (covering Great Britain, the Isle of Man and the Channel Islands) were made available on CD ROM as the *1881 British Census and National Index*. Data was transcribed from 1.2m pages of original CEBs, including any errors contained therein. Although the accuracy of the transcription was checked, both the original CEBs and the transcribed version inevitably contain inaccuracies (Tillott, 1972; Higgs, 1996; Woollard, 1997). The transcribed CEBs for 1881 form the basis of 'the largest collection of historical source material to be made available in computerised form' (Schürer and Woollard, 2003). The CEBs have been used as a source for a number of biographical and prosopographical studies of the early accountancy profession. Most recently they have constituted the raw material for studies of the location of accountants in the social structure and the feminisation of bookkeeping in Britain (Walker, 2002, 2003).

Table 1
Regional distribution of accountants, 1881

<i>Region (Census divisions)</i>	<i>Accountants</i>	<i>% of cases</i>	<i>Accountants per 100,000 population</i>	<i>Average age (where known)</i>
London and South Eastern	5,122	31.6	77	40.0
South Midland	266	1.6	22	41.6
Eastern Counties	514	3.2	38	41.4
South Western	1,436	8.9	77	38.2
West Midland	1,693	10.5	56	39.6
North Midland	466	2.9	28	40.3
North Western	1,894	11.7	46	38.7
Northern	804	5.0	50	36.1
Yorkshire	982	6.1	33	38.5
<i>Total England</i>	<i>13,177</i>	<i>81.5</i>	<i>54</i>	<i>39.3</i>
<i>Wales</i>	<i>1,103</i>	<i>6.8</i>	<i>70</i>	<i>36.0</i>
Scotland – Northern	632	3.9	40	35.0
Scotland – Southern	1,201	7.4	56	35.9
<i>Total Scotland</i>	<i>1,833</i>	<i>11.3</i>	<i>49</i>	<i>35.6</i>
<i>Islands</i>	<i>67</i>	<i>0.4</i>	<i>47</i>	<i>37.3</i>
Total	16,180	100.0	54	38.7

For the purposes of the current study the 1881 *British Census and National Index* was searched by occupation to identify all individuals who were described as accountants on census night. Numerous variations of the word 'accountant' were discovered. These included abbreviations such as 'Acct', 'Acctt', 'Acctnt', 'Acctant', 'Accountt', and misspellings such as 'Accountnt', 'Accountant', 'Accountant', 'Accountant', 'Accountant', 'Accountant', 'Accountant', 'Accountant', and 'Accountnant'. There was also the odd case of traditional usage such as 'Accomptant'. Some accountants included credentials or other indications of membership of a professional organisation in their occupational description. The emphasis of the study being on those identified as accountants the database includes apprentice accountants and those who pursued accounting with other occupations. It excludes bookkeepers (for whom see Walker, 2003), cashiers (unless these descriptions formed part of a multiple occupational title which included 'accountant'), clerks to accountants, actuaries and auditors (even though these were classed as accountants by the census authorities) and other descriptions that may have encompassed the performance of accounting functions such as women housekeepers, the bursars of schools, pursers of mines and ships, treasurers of local authorities and other organisations, and commercial clerks. It should also be noted that members of professional bodies whose occupational descriptions in the CEBs did not contain 'accountant', or a variant

thereof, were not included in the population studied. The database included 16,180 individuals.

3. Spatial analysis

Table 1 shows the distribution of accountants by census region in 1881.

The table reveals that 88.3% of accountants in Great Britain in 1881 were located in England and Wales and 11.3% in Scotland. Almost one third of accountants were enumerated in London and the south east of England on census night. The highest regional densities of accountants were in south-west England, London and south-east England, and in Wales. The lowest densities were in the north and south Midlands, Yorkshire, and the eastern counties. The data in Table 1 also indicates that the average age of accountants on the fringes of Great Britain (in Wales, Scotland and the northern counties of England) was marginally lower than for the island as a whole. The age distribution of accountants was notably younger in Scotland. In England 15.2% of accountants were aged 15–24 years compared with 19.7% in Wales and 27.5% in Scotland. Other national and regional differences relate to the transience of accountants, as indicated by the numbers who were boarding and lodging on census night. In England 10.8% of accountants were boarders or lodgers. This compares with 15.2% in southern Scotland and 24.5% in northern Scotland. The likely reasons for these geographical variations are explored later in the paper.

Although it illustrates broad patterns regional

Figure 2
Density of accountants in registration districts of northern England (with place names of districts where density greater than 100 per 100,000)

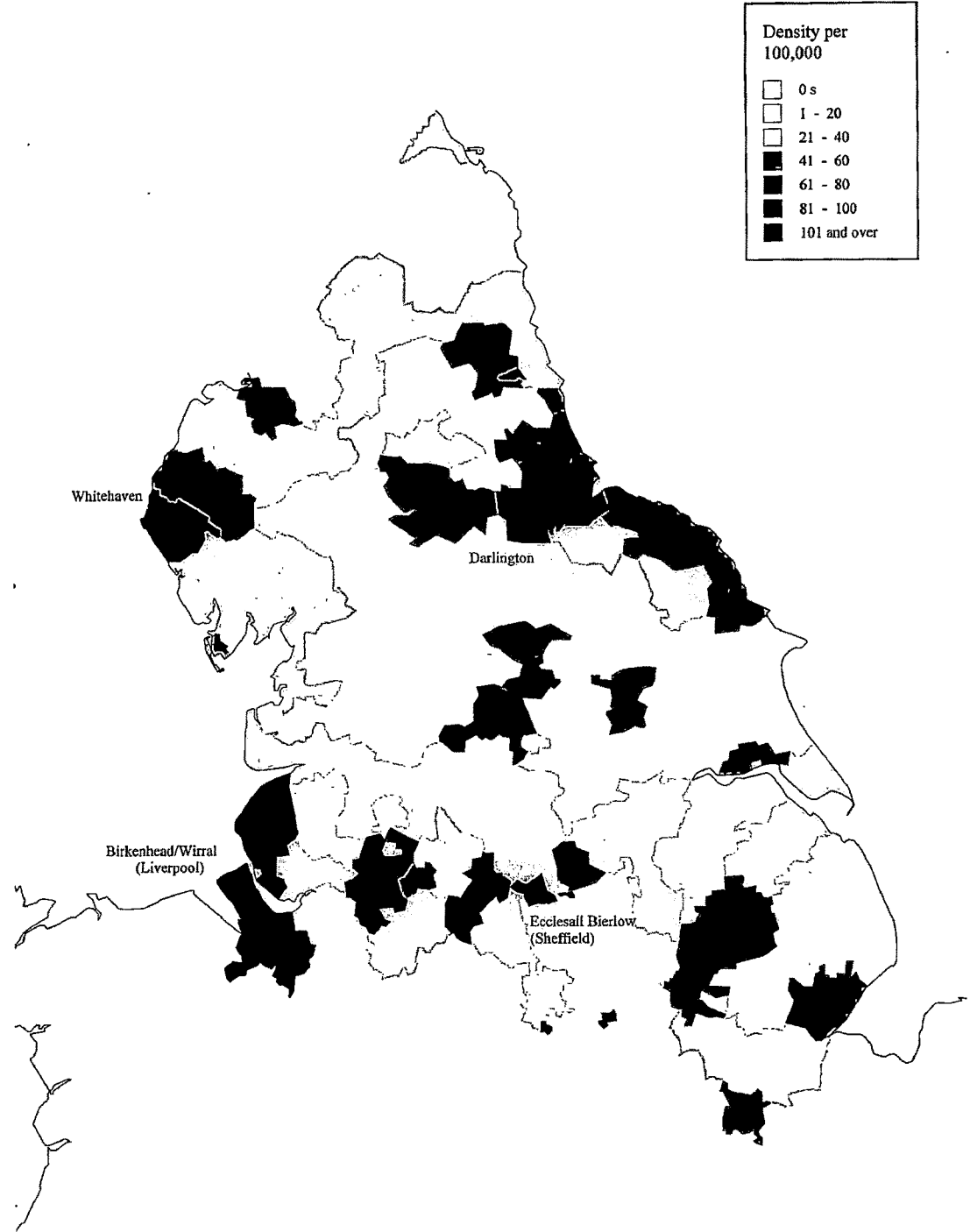


Figure 3
Density of accountants in registration districts of southern England and Wales (with place names of districts where density greater than 100 per 100,000)

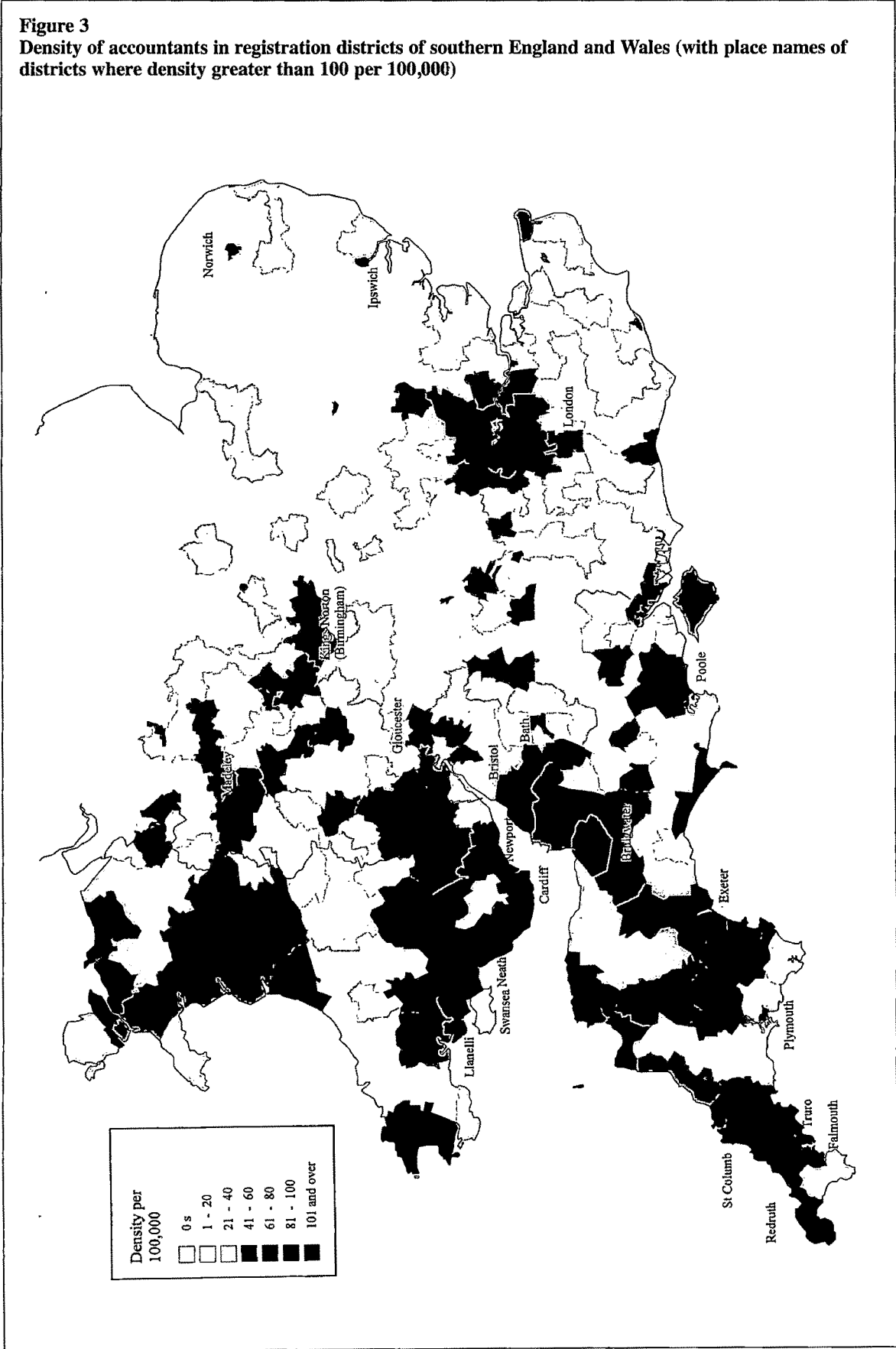


Table 2
District analysis of counties in South West Britain with high densities of accountants, 1881

<i>Registration district(s)</i>	<i>Registration county</i>	<i>Accountants</i>	<i>Density per 100,000 where greater than 100</i>
Llanelli	Carmarthen	61	138
Other Carmarthen	Carmarthen	30	45
Cardiff	Glamorgan	190	179
Swansea	Glamorgan	153	161
Neath	Glamorgan	59	113
Other Glamorgan	Glamorgan	132	50
Newport	Monmouthshire	76	107
Other Monmouthshire	Monmouthshire	78	48
Bristol and environs	Gloucestershire	456	204
Gloucester	Gloucestershire	61	130
Other Gloucestershire	Gloucestershire	117	46
Bath	Somerset	115	162
Long Ashton	Somerset	99	148
Bridgwater	Somerset	43	126
Other Somerset	Somerset	151	47
Exeter and environs	Devon	146	170
Plymouth	Devon	130	176
Other Devon	Devon	276	62
Falmouth	Cornwall	47	181
Truro	Cornwall	49	136
Redruth	Cornwall	61	133
St Columb	Cornwall	17	106
Other Cornwall	Cornwall	121	60

analysis hides considerable variation in the concentration of accountants in particular counties and districts. The density of accountants in the counties is revealed in Figure 1. The concentration of accountants in localities of England and Wales is shown in Figures 2 and 3.

One of the most notable findings of the study was the high density of accountants in the south-west of Britain – more particularly, in counties bordering the mouth of the River Severn and the Bristol Channel, from Carmarthen through Glamorgan, Monmouthshire, Gloucestershire, Somerset, Devon and Cornwall. Here the density was 95 per 100,000. The density of accountants in Gloucestershire, at 123 per 100,000 was the highest of any county in Great Britain in 1881. As Table 2 and Figure 3 reveals, within these counties there were far greater concentrations of accountants in particular registration districts.

Close examination of local densities, in tandem with the extended occupational descriptions of some accountants in the CEBs, suggest a number of features of districts with high concentrations of accountants in the south-west of England. First, with few exceptions the centres were sea or inland ports. Particularly noteworthy is the presence of

555 accountants (191 per 100,000 inhabitants) in the Bristol area. Other ports in the region also exhibited significant concentrations including Haverfordwest (71), Bideford (89) and Barnstaple (79). Second, there were high densities of accountants in centres associated with the extraction and distribution of minerals and metals such as coal exporting from Cardiff and Newport and tin and copper mining in Redruth, St Columb and Truro, Cornwall.¹ Third, there were concentrations of accountants in centres for the processing of metal ore such as tin and copper smelting in Llanelli, Neath and Swansea. Fourth, several concentrations of accountants were found in county towns, service centres and gathering places for genteel society. These included Bath, Exeter and Gloucester. In Exeter (registration district), a cathedral city, financial and legal centre, the density of accountants was as high as 250 per 100,000 and had been 295 in 1851 (Walker, 2002).

These features of the south-west also apply to other parts of Great Britain. Commercial ports which were also major administrative and financial centres tended to exhibit high densities of accountants, as in the metropolis (Middlesex and Surrey = 93 per 100,000) and the Scottish capital (Midlothian = 106 per 100,000). In the north west of England the density of accountants was greatest in the leading port of Liverpool and environs (84

¹ In 1880 39.0% of British coal exports were made from ports in the Bristol Channel (Evans, 1989).

per 100,000). Densities were high in other coal and iron export ports of the north such as Newcastle-upon-Tyne (97) and Whitehaven (132). On the south coast of England there were concentrations of accountants in commercial ports such as Poole (111 per 100,000) which had an extensive coastal trade in clay and corn; Weymouth (94) which boasted a coastal trade in Portland stone and its sub-port, Bridport (93). High densities in areas associated with metal processing include Ecclesall Bierlow, Sheffield (104) famed for the production of steel and steel products; Darlington (183) noted for iron and steel founding and engine building; and Middlesbrough (92) reputed for its large scale iron production and port. Similarly, in the West Midlands we may note Kings Norton (165) and Solihull (90) in the Birmingham area, associated with iron and brass founding, metal-working and engineering, and centres such as Madeley (104) and Worcester (97) where iron and porcelain production were conducted.

Worcester was also one of a number of other local administrative and service centres in which accountants were concentrated. In many cases these were in counties where the density as a whole was very low: Norwich (107), Ipswich (102), Cambridge (80), Oxford (95), Chester (83) and Derby (63). In addition to Bath, other watering places with high densities of accountants were Brighton (84) and Knaresborough (including Harrogate) (74). In Wales there were high densities in port and seabathing towns such as Bangor (85) and Aberystwyth (62). The findings also indicate the flight of the middle classes to the suburbs in large urban centres. In London the highest concentrations of accountants were in Lambeth, Camberwell, Lewisham, Hackney, Islington, Hampstead, Fulham, Richmond, Brentford, Lewisham and Croydon. Similarly, the density of accountants was comparatively low in the city centres of Manchester, Liverpool, Sheffield and Birmingham.

Interestingly, in areas most associated with factory production, such as Lancashire and Yorkshire, the density of accountants averaged only 39 per 100,000 in 1881. In the Manchester area the density was 53 per 100,000. Densities in nine towns associated with textile manufacture (Blackburn, Bolton, Burnley, Bury, Chorley, Clitheroe, Oldham, Rochdale and Wigan) averaged only 20 per 100,000. In the south, however, there were localised concentrations of accountants in centres associated with textile production. One example is Tiverton, Devon, famed for its large lace manufactory, in which district the density was 97 per 100,000. These, and other findings such as the high concentration of accountants in mining districts of Cornwall but not in similar areas of the East Midlands and north-east England, suggest the

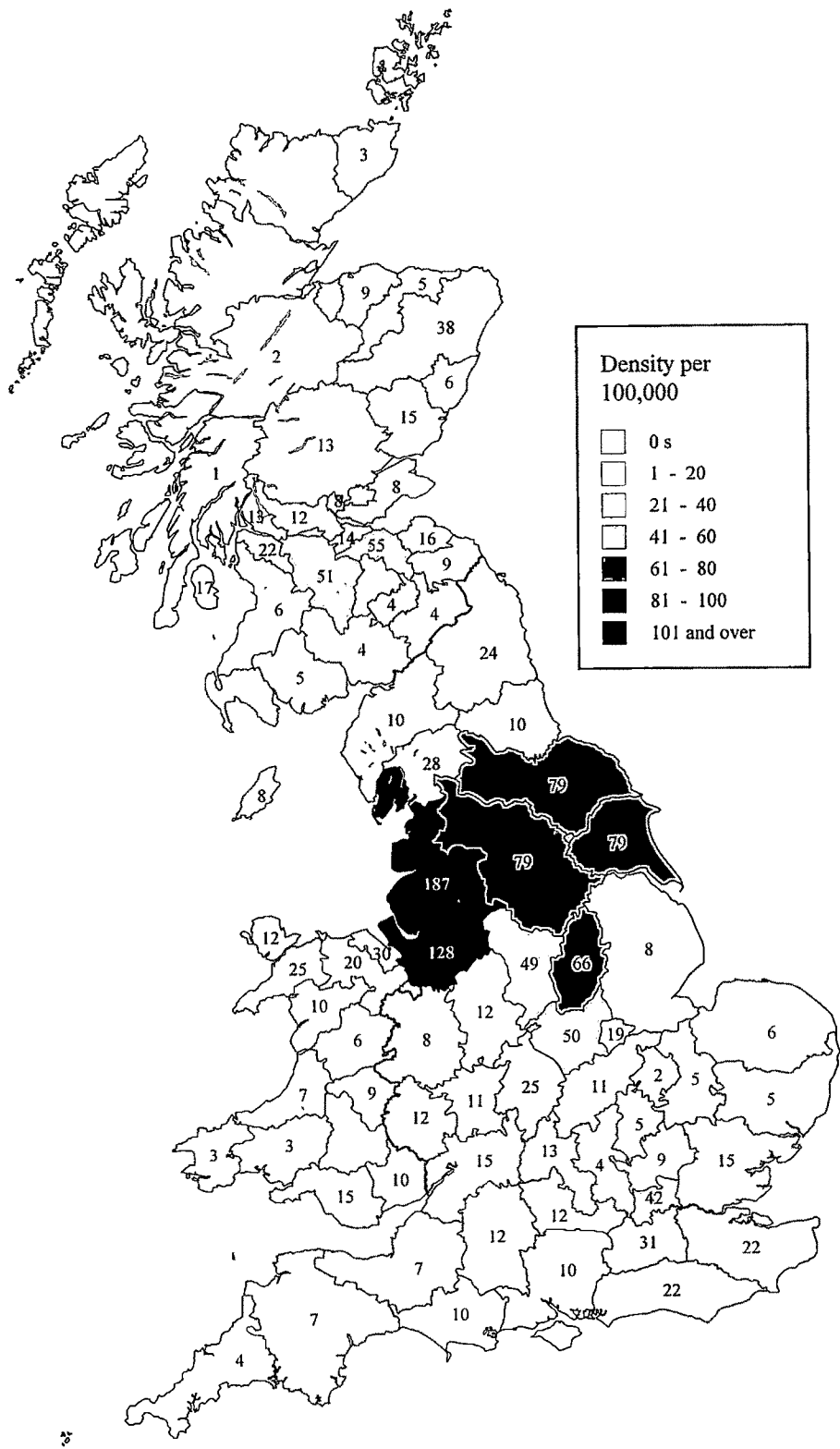
possibility of regional and perhaps local variations in the performance of accounting functions, in the use of occupational descriptions, and the potential significance of socio-cultural as well as economic factors in understanding such variations.

3.1. *Explaining spatial variations in occupational identity*

One possible explanation for variations in the spatial distribution of accountants relates to the allied occupation of bookkeeping. It may have been the case that in some locations, such as the south-west, the designation 'accountant' was adopted to describe the performance of functions which elsewhere would attract the title of 'bookkeeper' or commercial clerk. Parker (2004), for example, has speculated that the high number of accountants (135) appearing in an Exeter directory in 1878 'must have included many bookkeepers and clerks in paid employment'. Further, while the trades section of *Kelly's Directory of Cornwall, 1883* contained the names of 42 individuals who offered their services as accountants, the database includes 295 persons who were described as accountants in the CEBs of 1881. Burt (2003) has indicated that a number of 'accountants' in Cornwall were likely to have been bookkeepers or pursers in mines. A few individuals described as accountants in the county directory were entered in the census as mine purser or mine clerk. As Figure 4 reveals, bookkeepers were much more common in the manufacturing centres of north-west England. In this region, where the density of accountants was surprisingly low, the greatest concentration of bookkeepers was to be found in 1881 (Walker, 2003).

Such variations in the use of the terms 'accountant' and 'bookkeeper' accord with contemporary observations on the problems of occupational definition. During the late 19th century professionalising accountants were anxious to demarcate the professional from the non-professional accountant. Their task was difficult because the territory of accounting itself embraced tasks associated with the lesser occupation of bookkeeper. As much as they attempted to distinguish the work of the public practitioner from that of the closeted keeper of the books in a commercial concern, professional accountants were often frustrated when they discovered that 'Many people appear to think that there is no distinction between a Book-keeper and an Accountant proper' (*Accountant*, 6.9.1879). In the early twentieth century popular reference works such as *Encyclopaedia Britannica* continued to relate that the term 'accountant' was sometimes erroneously adopted by bookkeepers. Even its own definition of an accountant referred to 'an expert in the science of book-keeping' (1910-1911:Vol. 1).

Figure 4
Density of bookkeepers in counties of Great Britain, 1881



The data drawn from the CEBs indicates that accountants in high density areas such as the south-east and south-west of England were marginally more inclined to describe their occupation as unadulterated 'accountant' and less likely to use a designation that indicated clerking. This indicates variation in the degrees of entrenchment of occupational specialisation. Further, there is some evidence to suggest a relationship between the proportion of accountants whose relation to the head of household in the census was son or stepson and the density of accountants. Of accountants in the database, 17.7% were sons or stepsons. In high density regions such as south-west England and Wales the percentage of sons and stepsons was higher, 23.6% and 21.0% respectively. In the low density regions of the Eastern counties of England and the north Midlands, the percentage of sons and stepsons was only 9.7% and 13.1% respectively. This may indicate a convention for fathers in some regions to describe the son who assists in the family business as his 'accountant,' as opposed to his bookkeeper or clerk.

These variations should be considered in the context of geographical and socio-cultural differences in vocabularies and the meanings and senses of English words (Jackson and Zé Amvela, 2000:121–130). Spatial variations in the use of occupational descriptions during the 19th century have been identified in other studies. Recent attempts to construct cross-national occupational classifications using census data reveal: 'The meaning—even within one language—of an apparently straightforward occupational title can vary depending on the geographic, temporal, or industrial context' (Roberts et al., 2003). This problem frustrated the efforts of the census authorities to accurately enumerate the occupations of the people in 1881:

'...again and again, one and the same name is used for totally different occupations. By Clothier is meant in some parts a Cloth-maker, whereas in other parts it means Clothes-dealer. By Bricksetter is in some parts meant a Bricklayer, whilst in most parts it means a man who performs certain operations in Brickmaking. By Bank Manager is ordinarily meant the manager of a money bank, but in mining parts it is also occasionally used for the man who superintends the operations at the pit's mouth. By Drummer may either be meant a Musician or a Blacksmith's hammerman; by Muffin-maker, ei-

ther a man who makes the eatable that bears that name, or the man who makes what is known as a muffin in China manufacture. An Engineer may be either a maker or a driver of engines. A Collar-maker may be a Seamstress or a Harness-maker. A Bookcase-maker may be a Cabinetmaker or a Bookbinder, and so on. In these instances the confusion is only between two occupations; but there are other cases, much more numerous and much more troublesome, in which a common name is used for some branch of perhaps half a dozen or even more trades' (*Census of England and Wales, 1881:27*; also Higgs, 1996:95).

It is quite likely that a relatively loose occupational title such as 'accountant' could encompass 'different tasks in different places' or terms such as accountant and bookkeeper could 'describe the same occupation in different places' (Roberts et al., 2003).² The tasks performed by many of the accountants employed in the south-west of Britain might have merited the description bookkeeper if located in manufacturing centres in the north of England. Indeed, instructions issued to clerks in the Census Office in 1871 suggest that as well as describing clerical functionaries, the title 'bookkeeper' was also specifically associated with textile production (*Census of England and Wales, 1871:79*).

As suggested above, it is possible that the use of the term accountant in the South West reflected socio-cultural factors. It is possible that sectoral and regionalised occupational descriptions were sustained through the trading links and business and social networks which were strong in this part of Britain (Burt, 2003). Certainly, economic and business historians are increasingly alert to the importance of formal and informal capital, trading, credit and social networks in the transmission and embedding of district and regional cultures and identities, particularly during the nineteenth century (Hudson, 1989; Wilson and Popp, 2003). The high densities of accountants in the port towns of south-west England and Wales suggest the potential significance of linkages through coastal transport. During the mid-19th century numerous small ships registered in ports such as Bristol, Bridgwater, Bideford, Barnstaple, Bridport, Exeter, Falmouth, Truro, Aberystwyth, Beaumaris and Caernarfon were engaged in a substantial home trade (Greenhill, 1968:43–44). For example, copper ore was sent from the ports of Devon and Cornwall to Swansea, Llanelli and Neath for smelting and the ships returned with a 'back-trade' of coal (Stainer, 1979). Coal was sent from Cardiff and Newport to Bridgwater, Bristol and Barnstaple. Salt and flour was transported from Gloucester to Bridgwater. Livestock and grain was transported between South Wales and Somerset.

² For example, clerks in the Census Office were alerted to the fact that in London a person who laid slates on a roof was known as 'slater' but in the west he would be described as a 'parchester'. In some counties a maker of shoes was known as a 'shoemaker', in others he might be described as a 'cordwainer'. (*Census of England and Wales, 1871: 7*).

Table 3
Female bookkeepers in English counties where the density of accountants was greater than 70 per 100,000, 1881

<i>County</i>	<i>Accountants per 100,000</i>	<i>Bookkeepers per 100,000</i>	<i>% Female bookkeepers</i>
Gloucestershire	123	16	56.6
Surrey	97	31	51.4
Middlesex	91	41	59.7
Devon	91	7	68.3
Cornwall	90	4	46.2
Somerset	83	7	50.0
Mean	95	29	57.5

Table 4
Male bookkeepers in English counties where the density of bookkeepers was greater than 70 per 100,000, 1881

<i>County</i>	<i>Bookkeepers per 100,000</i>	<i>Accountants per 100,000</i>	<i>% Male bookkeepers</i>
Lancashire	185	43	95.4
Cheshire	133	65	93.5
Yorkshire	79	33	94.0
Mean	136	41	94.9

Bristol was connected via the coastal shipping with ports throughout the south west and distributed wine and tobacco. There was also a regular carriage of other goods and passengers through the region and beyond, particularly before the railways.

Also of potential significance in the prevalence of accountants in port towns was the financing structure of commercial shipping ventures. Bryer (2006) has recently drawn attention to the importance of ports as locales for the propagation of the capitalist mentality. This emerged from the socialisation of capital associated with ship owning and commerce after the late 16th century. During the period of the current paper merchant ship capital was similarly socialised under the statutory system of fractional ownership (64 shares). Contributors of capital in small vessels were often manifold local professionals, farmers and tradesmen. Importantly, as Greenhill (1968:192) has stated: ‘These little ship-owning groups, which were particularly common in the south-west of England, were often closely tied in with the local industries. Such groups of small capitalists enabled the small, closely-knit community to create, operate and control from within itself its own mining, quarrying, manufacturing and shipping activities’. Detailed accounts were kept and audited of the amounts invested in the vessel, the costs and revenues of voyages and distributions to the several owners

(Greenhill, 1968:231–252).

In England in 1881 there were 54 accountants and 49 bookkeepers per 100,000 inhabitants. While variations in the application of the two occupational descriptions may reflect traditional usage in particular regions and sectors and were sustained by networks, the data presented in Table 3 indicates another potentially significant factor in explaining the tendency in the south of England to employ the description accountant rather than bookkeeper. The data suggests an inverse relationship between densities of accountants and bookkeepers, and also points to variations in the feminisation of bookkeeping by 1881.

The analysis suggests that where, in the south of England, bookkeeping was feminised by 1881 the occupational description ‘accountant’ was more commonly employed than bookkeeper. Further, as the content of Table 4 suggests, in counties where bookkeeping remained masculine, such as the north-west of England and Yorkshire, the description ‘bookkeeper’ was more frequently applied than ‘accountant’. In fact there is a strong correlation ($r=0.6$) between the percentage of female bookkeepers in English counties and the proportion of accountants and bookkeepers who are described in the CEBs as ‘accountant’. It is possible that once there was a significant number of female bookkeepers in the county, men performing routine accounting functions assumed the distinguish-

Table 5
Marital status of female accountants in England and Wales, 1881

<i>Marital Status</i>	<i>Cases</i>	<i>%</i>	<i>Mean age (years)</i>
Unmarried	128	71.5	30.3
Married	24	13.4	43.9
Widowed	23	12.8	52.3
Not known*	4	2.3	17.0
Total	179	100.0	34.6

*It is likely that these women were unmarried.

ing occupational title of accountant. This was likely due to the fact that where it was feminised, bookkeeping was not only perceived as woman's work but with employment in female domains such as board and lodging, the provision of food and drink and the production and servicing of dress (Walker, 2003). Hence, in English counties in 1881 where less than 20% of bookkeepers were female the average ratio of bookkeepers to accountants was 2.8:1. In counties where more than 20% of bookkeepers were women the ratio of accountants to bookkeepers was 3.1:1.

The data suggests therefore, a significant gendered distinction between accountants and bookkeepers in certain regions of Britain. However, a small number of women were described in the CEBs as accountants. These are the focus of the next section.

4. Female accountants

Instances of female accountants in the transcribed CEBs were checked to the on-line manuscript version of the enumerator's books to provide assurance that these women were thwarting convention by being so employed. This search resulted in the identification of 190 women accountants of whom 179 were resident in England and Wales and 11 in Scotland.³ Women represent 1.2% of accountants in the database and this compares with the 18% of bookkeepers who were female in 1881 (Walker, 2003). While the number of women accountants in the CEBs exceeds that reported in the published census (which enumerated 89 in England and Wales and none in Scotland) their numbers are clearly insufficient to challenge the assumption that the occupation of accountant was gendered male during the late 19th century (Lehman, 1992; Kirkham and Loft, 1993).

The ages of female accountants ranged from 15 to 89 years. The average age was 34.6 years (compared to 26 years for female bookkeepers). Only

12.8% of female accountants in England and Wales headed the households in which they resided on census night. The majority (59.2%) of female accountants were daughters, sisters and other female relatives of the head of household. A further 12.8% were lodgers or boarders and another 6.1% were identified as servants or assistants. The age distribution by marital status of female accountants is revealed in Table 5.

The married women accountants are of particular interest given their apparent departure from the contemporary ideal of the domestic wife. Closer analysis of this group suggests three sets of circumstances. First, in a small number of instances it is likely that the wife was effectively 'accountant's wife', accountant being her husband's occupation. However, we cannot be certain from a scrutiny of the CEBs that this was always the case. Second, some accountant wives appear to have been engaged in the family business, performing accounting tasks for a husband who was a retailer or craftsman. Third, and more common, were wives who were separated from their husbands and likely to be pursuing an independent income as accountants. These women tended to reside in the home of a relative (usually a parent) or lodged in a household whose members were involved in retailing or trades. However, a few such married women accountants headed their own households.

Widowed accountants are also of interest given their potential pursuit of paid work following the death of a husband. Although the numbers are small, this group appears to have comprised cases as follows. First, it is possible that one or two women were annuitants but were transcribed as accountants in error, though the evidence contained in the CEBs is not conclusive. Second, widows who resided with a relative (often parents) or were living in the home of a retailer or tradesman, such as a butcher, baker and confectioner, and acted as accountant to the same. Third, widows who performed accounting functions in philanthropic institutions or small, family-run schools. Fourth, young widows who headed their own households, kept a servant and were employed as accountants. Fifth, in one or two instances it appears that wid-

³ It should be noted that the occupations of female accountants in Scotland have not been agreed to the original CEBs as these were not available online at the time of writing.

Table 6
Spatial distribution of female accountants in England and Wales*

<i>Region (Census divisions)</i>	<i>Cases</i>	<i>%</i>	<i>Females as % of accountants in the region</i>
London and South Eastern	99	55.3	1.9
South Midland	4	2.2	1.5
Eastern	6	3.4	1.2
South Western	43	24.0	3.0
West Midland	10	5.6	0.6
North Midland	2	1.1	0.4
North Western	7	3.9	0.4
Northern	2	1.1	0.2
Yorkshire	0	0.0	0.0
Wales	5	2.8	0.5
Islands	1	0.6	1.5
Total	179	100.0	1.2

*Excludes 11 female accountants in Scotland not checked to original CEBs. These represent 0.6% of accountants in that country.

ows carried on the husband's accounting practice shortly after his death with an accountant son. For example, when William W. Fletcher, accountant, died, his wife Sophia of St Pancras seems to have continued the practice, either assisting or assisted by their son Joseph. Henrietta Tattersall of Bowdon, Cheshire was entered in the CEB of 1881 as 'Partner in Accountants Firm'. She had been married to Charles Tattersall, Public Accountant, and it is likely that she temporarily continued his practice with her 20-year-old accountant son, Charles. These cases represent the only suggestion from the CEBs that women were involved in offering accountancy services to the general public in 1881.

It is clear from the data in Table 6 that the majority of the female accountants (79.3%) in England and Wales were located south of a line drawn between the Thames and Severn estuaries. This is reflected in the counties in which more than 10 were located: Middlesex (49), Devon (21), Surrey (17) and Kent (12).

A small number of women accountants were economically inactive. Three were unemployed, one was retired and one was a pauper in Walsingham Union Workhouse, Norfolk. Two were described in the CEBs by their sex, as 'female accountant'. In most instances the occupation of women accountants is simply recorded as 'accountant'. In 38 cases it is possible to identify the organisation in which the accountant was employed. This is possible because occupation was more fully described in the CEB as 'accountant in' or 'accountant to'. Insights were also provided where the relationship of the accountant to the head of household was stated as 'servant', 'accountant' or 'assistant' (and the head of house-

hold's occupation is given) and where occupation is stated as 'father's accountant' (and the father's occupation is given in the CEB). The results reveal that these female accountants were principally employed in retailing and distribution, and particularly in trades concerned with food and textiles. The most common employments in this sector were accountant to butcher (eight cases), draper (eight), grocer (three) and hotel (two). In 1881 a few women were also designated as accountants on farms (dairying in particular) (three), in the home (two) and with charitable institutions (two). Fanny Scroope, nun, was accountant to the Convent of the Sacred Heart, Putney. Three women were accountants in Cornish tin and copper mines. With the exception of the latter these sources of employment are similar to those reported for women bookkeepers in 1881 (Walker, 2003). It is also likely that a large proportion of female relatives described in the CEB as merely 'accountant' who were resident in the homes of butchers, grocers, bakers, dressmakers and craftsmen were accountants to those pursuing such trades.

5. Occupational status and identity

Accountants identified in the CEBs were classified into four groups, as indicated by their occupational descriptions and status in the household. The categories were accountants, accountants who combined accounting with one or more other occupations, accountants who were employed in specific organisations, and those who were described as accountants but whose principal function related to routine accounting tasks such as clerking, bookkeeping or cashier. Of the accountants in the database, 7.3% were known to be members of professional organisations at the time the census was

Table 7
Occupational categories of accountants in the CEBs, 1881

<i>Category</i>	<i>Members of professional organisations</i>	<i>Non-members of professional organisations</i>	<i>Total</i>
Accountants	1,077 (90.6%)	10,464 (69.8%)	11,541 (71.3%)
Accountants with multiple occupations	99 (8.3%)	938 (6.2%)	1,037 (6.4%)
Employee accountants	7 (0.6%)	2,619 (17.5%)	2,626 (16.2%)
Accountant clerk	6 (0.5%)	970 (6.5%)	976 (6.1%)
Total	1,189 (100.0%)	14,991 (100.0%)	16,180 (100.0%)

taken. As Table 7 reveals, the vast majority of these were included in the categories of 'accountant' and accountants with multiple occupations.

There were variations in the demographic profiles of accountants in the four categories. The average age of accountants and accountants with multiple occupations was 39.6 and 42.8 years respectively. This compares with 30.9 for accountant clerks and 35.9 years for employee accountants. Variations in age distribution were also discerned. Whereas 54.8% of accountants and 44.0% of accountants with multiple occupations were aged 40 years or under, the percentages for accountant clerks and employees were 76.3% and 67.4% respectively. Not surprisingly, many of those embarking on a career in accounting commenced as clerks, apprentices and assistants. Of the 63 individuals in the database aged below 15 years, 26 fell within the accountant clerk category. The younger age distribution of accountant clerks was also reflected in the fact that 38.9% were sons resident in parent's homes on census night compared to 17.4% of accountants and accountants with multiple occupations. Another difference between the four groups is the proportion of employee accountants who were boarders or lodgers (16.7%, compared to 11.0% for the other categories).

The following sub-sections commence with an exploration of the primary occupational identities of accountants and proceed to identify the characteristics of those contained in the four occupational categories.

5.1. Primary occupational identities

The occupational descriptions inscribed in the CEBs for accountants and accountants with multiple occupations offer insights to perceived identity. They also suggest the existence of diverse and complex occupational definitions which compli-

cated contemporary professionalisation projects. Of the 12,578 cases in these two occupational categories, 11,031 (87.7%) were merely identified in the census as 'accountant'. The remainder employed a range of designations which indicated professional status (865 accountants were 'chartered', 26 were 'professional' and three were 'certified'); the domain in which accounting was performed (557 were 'public' accountants, one was a 'civil' accountant and 21 were 'private' accountants); the nature of clientele or work performed (35 were 'general' accountants, 32 were 'commercial' accountants, two were 'statistical' accountants, two were 'financial' accountants and one was a 'consulting' accountant); and sex (as in the two instances of 'female' accountant referred to earlier).

The primary occupational identity of employee accountants and accountant clerks was conditioned by their status as employees and clerks. However, three employees were 'chartered' accountants and four were 'commercial' accountants. Ten accountant clerks were 'general' accountants, two were 'commercial' accountants, one was a 'private' accountant and one was a 'public' accountant. The occupational identity of a number of those classified as employee accountants in the database is also likely to have been conditioned by their employment status. For example, 27 accountants (including seven women) were entered as 'servants' in relation to the head of household. A further seven (four females and three males) were identified as 'assistants'. It appears that almost all 'servants' and 'assistants' were employed in retailing and distribution.

For 115 accountants contained in the database occupational identity was likely to have been secondary to their institutionalised status. At the time of the 1881 census, 42 accountants were resident

in lunatic asylums (of whom five were in pauper asylums), 11 were in hospitals (three in workhouse infirmaries) and four in sanatoria (institutions for the treatment of tuberculosis). 31 accountants were in prison and 23 were in workhouses. A further three were resident in institutions dedicated to the care of the aged such as Little Sisters of the Poor and Sutton's Hospital in Charterhouse (a home for impoverished gentlemen). One accountant was located in a refuge for the homeless in Spitalfields.

5.2. *Accountants*

Those classified in the study as 'accountants' comprise the most numerous and the least interesting occupational category. This is because the occupational description inscribed in the CEBs was little more than simply 'accountant'. The category relates to those whose occupational description refers to nothing beyond the practice of accounting, be it in a professional (9.3% were members of professional bodies) or non professional capacity (90.7%). A number of these 'accountants' would have been in public practice while others were engaged in unknown organisations. In the cases of 768 of the 11,541 individuals classified as 'accountants' detail is provided as to employment status. 289 of these were apprentices (68 to chartered, and 221 to other accountants); 22 were described as 'assistant'; 41 were specifically identified as employing others (as in 'accountant employing six clerks and three apprentices'). In 416 cases economic inactivity was indicated by the occupational description: 255 were retired, 20 were 'formerly' accountants, 138 were out of employment and three were paupers. Because of its close proximity to audit, those accountants whose occupational description referred to the practice were not treated as having a multiple occupation. There were 69 instances of 'accountant and auditor', 24 of 'public accountant and auditor', six of 'chartered accountant and auditor' and one of 'professional accountant and auditor'. In 14 cases reference was made in the occupational description to graduate or university student status. In 51 cases non-vocational pursuits were mentioned: 18 referred to preaching in Nonconformist churches; 10 to being magistrates or Justices of the Peace, 10 to service in local militia, seven to service on local councils and six were 'organists'.

5.3. *Accountants with multiple occupations*

Descriptions in the CEBs which refer to more than one occupation are both problematical and insightful. While they illuminate issues of occupational identity, diversity, task and jurisdiction they also involve problems of interpretation, such as determining whether an occupational title represents a separate vocation. Another issue is identifying which of the several occupations recorded

for an individual was the most significant (Woollard, 2004).

For the purposes of the analysis accountants with multiple occupations were understood as those who combined accounting with one or more other occupations, irrespective of whether 'accountant' was the first or a subsequently named occupation. In determining the pursuit of multiple occupations descriptions which referred to honorary or voluntary activities were excluded. Hence those whose occupations were recorded, for example, as 'accountant and town councillor', 'accountant and preacher', 'accountant and evangelist', 'accountant and officer in local militia', or 'accountant and organist', were not classified as having multiple occupations. However, an 'accountant, estate agent and Baptist Minister' would be deemed to have had dual occupations.

Some 1,037 individuals in the database were classified as accountants with multiple occupations. In almost two-thirds of such cases 'accountant' was the first named occupation (and, according to the convention adopted by census-takers, was assumed to be the most important pursued by the individual (Woollard, 2004)). In 946 (91.2%) cases one other occupation was entered in addition to accountant, in 78 (7.5%) cases two other occupations were recorded, in 8 (0.8%) cases three other occupations, and in 5 (0.5%) cases four or more occupations were recorded. The accountant with the most diverse occupational profile was John C. Collier of Godalming, Surrey who appears in the census as 'Bank Manager, Accountant, House Land and Insurance Agent, Distiller of Wood employing 11 labourers, Farmer of 1115 acres employing 6 labourers'. He was closely followed by John Clarey of Stone, Staffordshire who was a 'Certified School Teacher, Auctioneer, Valuer, Accountant, Commission Agent'.

Although only 6.4% of accountants in the database were classified as having multiple occupations, there were variations in their spatial distribution. For example, in the London counties of Middlesex, Surrey and Kent, where there was a high density of accountants (86 per 100,000) and where occupational specialisation was likely to have been most developed, only 2.6% of accountants had multiple occupations. In the counties of Yorkshire, the East Midlands and East Anglia, by contrast, where the density of accountants was only 30 per 100,000 or less, there was greater occupational diversity. Here, 11.2% of accountants had multiple occupations. Such regional differences in occupational specialisation contribute to understandings of contemporary disputes over the definition of professional practice and the contrasts drawn between London and 'country' accountants (Walker, 2004b:253-256; Edwards et al. 2005).

Table 8
Occupations of accountants with multiple occupations, 1881

<i>Occupation type</i>	<i>Instances</i>	<i>Average domestic servants where head of household</i>
Agents	404	0.7
Auctioneers	105	0.7
Retailers	81	0.7
Brokers	75	1.9
Local administrators	66	0.7
Collectors	51	0.5
Surveyors	41	0.5
Valuers/appraisers	39	0.6
Dealers	31	0.4
Factors	30	0.8
Company secretaries/managers	28	1.5
Merchants	24	0.7
Actuaries	24	1.7
Craftsmen	23	0.8
Lawyers	19	0.8
Farmers	18	1.0
Teachers	18	0.6
Reporters/journalists	14	0.2
Manufacturers	8	1.7
Other	49	0.8
Total	1,148	0.8

The other vocations pursued by accountants with multiple occupations are summarised in Table 8.

The table reveals that the most significant other occupation pursued by accountants was agent. 170 of this group were estate, house or land agents, 75 were insurance agents and 32 commission agents. The next most common other occupation was auctioneering. If domestic servant keeping is taken as a proxy of income and wealth,⁴ the data contained in the table suggests that broking was the most lucrative occupation to combine with accountancy in 1881. The average number of domestic servants of accountants who headed households and engaged in stock or share broking was 1.9. The fact that the average number of servants in households headed by members of professional bodies who combined accountancy with stockbroking was higher at 2.8 may help explain the determination of accountants in some parts of Britain such as Glasgow and Sheffield to include stockbroking within definitions of professional practice. Other apparently lucrative occupations were manufacturing, actuarial work (primarily in Edinburgh and London) and the management and secretaryship of business such as railway companies and financial institutions.

A significant number of accountants with multiple occupations were involved in vocations which were some distance from traditional perceptions of

accounting work. One such example was retailing. The most frequently cited occupations here were stationer (particularly law stationer – suppliers of account books), grocer and draper. Those accountants also engaged in local administration tended to be registrars of births, marriages and deaths, and poor law officers in small and medium sized provincial towns. Collectors were involved in the retrieval of debts, rates and taxes. Accountants also identified as factors were primarily house factors in Scotland. Dealers included money lenders, pawnbrokers and occupations such as ship and beer dealing. Those who were also merchants traded in products such as coal, china, corn and timber. A surprising number of accountants with multiple occupations were involved in artisan work such as coach-building, printing, watch and clock-making, and cabinet-making. Accountants who were also surveyors of land and mines were mainly found in East Anglia, and the North and south-west of England. Accountants who also practised legal occupations were mostly located in Edinburgh and the south-east of England. All those individuals who combined accountancy with teaching (of accounting or other subjects) either privately or in schools were located in England and Wales. The remaining cases of multiple occupations include a diversity of titles such as accountant and engineer, artist, author, architect, draftsman or translator.

These findings attest to the fact that defining the scope of the occupation of accountant was ex-

⁴ See Walker (2002) for a discussion of the significance of servant-keeping.

Table 9**Occupational classification of employee and accountant-clerks (where sector is identifiable from the CEBs)**

<i>Class</i>	<i>Instances</i>	<i>%</i>
I. Professional	445	15.5
II. Domestic	0	0.0
III. Commercial	1,749	61.1
IV. Agricultural	22	0.8
V. Industrial	647	22.6
Total	2,863	100.0

treribly difficult in late 19th century Britain. The occupations with which it was combined also suggest that accounting was principally associated with commerce, trade and lower white collar work as opposed to the other professions. This had implications for claims to professional status.

Despite the attempts of their organisations to delimit professional practice, 8.3% of accountants in the database who were identified as members of professional bodies pursued multiple occupations. Interestingly, the frequency of multiple occupations was less common among ICAEW members (6.6%) than members of the Glasgow Institute (19.5%) who tended to pursue stock and sharebroking (Shackleton, 1996). A number of chartered accountants in Edinburgh and Aberdeen and members of the Scottish Institute of Accountants did likewise. However, actuarial work was the most frequently cited other occupation of professionals in the Scottish capital. The 63 ICAEW members with multiple occupations cited auctioneering (18 cases), insurance and house agency (18), stock and sharebroking (15), actuarial work (four), farming (two) and a series of other occupations (six) including bank manager, coal merchant, collector, consul, and company secretary.

5.4. Employee accountants and accountant clerks – sectoral distribution

In the cases of 2,863 (79.5%) of the 3,602 accountants classified in the study as employees and accountant clerks the occupational description or relationship to head of household entered in the CEBs permitted the identification of the industry in which the accountant was engaged. The sectors thus identified were analysed according to the occupational classification employed in the 1881 census. A summary of the results of the analysis is revealed in Table 9.

The largest group employed in Class I Professional were 131 accountants engaged in law offices, principally in firms of solicitors. In addition to the occupation of 'solicitor's accountant' (which often attracted the opprobrium of professional accountants (Walker, 2004c)) there existed a small number who specialised in drafting state-

ments of legal costs. More than 50% of accountants employed in the law were located in the south of England. Forty-two individuals employed in Class I were accountants to other professionals, principally to engineers (n=29) but also to surveyors, architects, physicians and the clergymen. Again most of these were located in the south of England.

Also included in Class I were 116 accountants employed in national government. Among this group were a small number of professionals such as Reuben Pearson of the ICAEW, who was Accountant Clerk to the Commissioner of Taxes, Henry W.S. Whiffen, retired Accountant-General of the Army and William Moncreiff, CA, Accountant of Court, Edinburgh. One quarter of this group in national government were employed by the Navy, at the Admiralty in London or at HM Dockyards in Chatham, Portsmouth and Plymouth. Indeed, 'naval accountant' appears to have been a relatively distinctive sub-occupation. Other significant employing departments included the Inland Revenue, the General Post Office and HM Customs. However, accountants were also engaged in a variety of other departments and capacities. These included senior positions such as accountant or deputy accountant to the India Office, the House of Lords, the Treasury, the Education Department and the Stationery Office. Not surprisingly, 65.5% of accountants in national government were located in London counties.

There were 120 accountants in Class I employed in local government. Though these were geographically dispersed, they were concentrated in the northern counties of England. The most common occupation cited by this group was 'borough accountant'. Two members of the ICAEW were borough accountants and a member of the Scottish Institute of Accountants was City Chamberlain and Accountant in Edinburgh. In all, there were 41 accountants to boroughs, cities and corporations in the 1881 census. A further 24 were involved in the local administration of the poor law and eight were engaged in parish administration. The remaining accountants in Class I comprised 36 individuals

engaged in a variety of educational, medical, scientific, artistic, religious and philanthropic institutions.

In Commercial Class III one occupational subgroup was dominant: the 1,061 accountants who were employed in banking. 51.6% of this subgroup were located in Scotland where 'bank accountant' was a distinctive vocation. The CEBs reveal that accountants were employed in a number of Scottish banks such as Bank of Scotland, Royal Bank of Scotland, Union Bank of Scotland, National Bank of Scotland, Dundee Savings Bank and the Clydesdale Banking Co. The historian of the last named has related how in addition to the bank accountant at head office the average branch was staffed by a part-time agent (manager), a full-time accountant, a clerk and an apprentice. The branch bank accountant was modestly remunerated for keeping the branch ledgers and calculating and applying interest to deposit accounts. He also performed internal audit and managerial functions:

'In practical terms the accountant at a branch was usually a head-office appointment and one of his responsibilities was to keep a check on the activities of the agent [manager], many of whom were part-time bankers with legal practices. Much of the burden of running an office therefore fell on the accountant, although the ultimate responsibility was the agent's. The branch accountant was in an extremely precarious position, balanced between the controls of head office and the needs of the agent to meet his customer's requirements and retain their business, especially where the agent's salary was tied to the volume of business' (Munn, 1988:49, 101; also Kedsle, 1990:28-34).

Although they were also common in bank branches in North Wales and the south-west of England, there appear to have been distinctive characteristics of bank accountants in England and Scotland, perhaps reflecting separate banking systems and career structures north and south of the Tweed. The different age distribution and transience of accountants in Scotland was noted earlier. The principal explanation for this appears to be the fact that bank accountants in Scotland were younger and more mobile than their counterparts in England and Wales. Of bank accountants in Scotland, 61.5% were aged under 30 compared to 32.2% in England and Wales; 33.8% were heads of households compared to 65.1% and 35.6% were lodgers or boarders compared to 21.4%.

Accountants were also engaged in other financial institutions: 92 in insurance and life assurance companies and 19 in building and friendly societies. Almost 50% of accountants employed in insurance were located in the London region although there were also concentrations in

Liverpool, Manchester and Edinburgh. A further 187 accountants were employed in a range of other commercial operations such as mercantile trade, warehousing, auctioneering and stockbroking. Again, almost half were located in the London region.

The second most distinctive occupational subgroup identified in this study was 337 railway accountants. In most cases the individual was described in the CEBs simply as 'railway accountant'. In some instances more detail was provided, such as the name of the railway company, an indication of the functions performed (such as audit, agency or cash management), and/or responsibilities for particular operations (such as locomotives, tramways, goods). A small number of this group were accountants to railway contractors. One half of railway accountants were located in the London counties where the offices of the main railway companies were based. However, there were other concentrations in the major railway engineering complexes at Darlington, Swindon and West Ham.

A further 53 accountants in the Commercial Class were employed in road and water transport. Of particular note here are cases of 'shipping accountant', accountants to steamship companies and ship owners, and 'ships accountant'. As noted above, the system of shareholding in merchant ships required accounting to the various suppliers of socialised capital. Accountants were also employed by dock boards and companies in Bristol and Southampton. The single most important location of accountants involved in shipping and docks was Liverpool. This resonates with the finding reported earlier, of high densities of accountants in commercial ports.

As Table 9 reveals, a small number of accountants were employed in Class IV, Agriculture. Of the 22 cases, 14 were accountants on estates with occupations such as 'Accountant estate office' and 'Steward's Accountant'. The remaining eight cases were farm accountants, several of whom appear to have been a daughter or a son keeping the books of the family holding.

Table 9 also shows that there were 647 cases of accountants employed in the Industrial Class. 56 of these were engaged in coal mining. Colliery accountants were mostly located on the South Wales coalfield, others were found in Durham and Yorkshire. In addition to coal mining, 32 individuals were employed in the distribution of coal as accountants to coal agents, traders and merchants, in towns such as Cardiff. A further 34 were engaged in gas companies and gas works. In total, therefore, 122 accountants were known to have been employed in branches of the coal industry – its mining, processing and distribution.

Others involved in extraction included 21 accountants engaged in quarrying for stone and clay.

Table 10
Servant keeping among employee accountants and accountant-clerks

<i>Occupation</i>	<i>N heads of households</i>	<i>Average domestic servants</i>	<i>% Servant keeping</i>
Accountants in national government	99	1.5	73.7
Bank accountants			
England and Wales	334	1.1	78.7
Scotland	185	0.7	52.4
Insurance accountants	72	0.9	61.1
Brewery accountants	30	0.8	56.7
Accountants in local government	100	0.6	55.0
Railway accountants	239	0.5	38.1
Mine accountants	61	0.5	44.3
Metal works accountants	90	0.5	48.9
Draper's accountants	21	0.4	38.1
Law accountants	95	0.3	29.5

Nine of these were slate accountants in Caernarvonshire. 33 accountants were employed in metal (tin, copper, iron and lead) mining. These were primarily located in the mining districts of West Cornwall and, to a lesser extent, Devon. In this context it should be noted that many mine companies in the south west were organised under the ‘Cornish Cost Book System’ (204 tin mines in Cornwall, 1873 (Burke and Richardson, 1981)). This system involved the appointment of a ‘purser’ who, lodged in the mine office or ‘counthouse’, performed a treasuryship function in a business conducted on a ready cash basis (Barton, 1968:45; Morris, 1997). The purser recorded transactions and decisions, made up the financial statements and distributed dividends on a frequent basis (quarterly or half yearly). His books were open to inspection by the ‘adventurers’ – the many suppliers of capital whose interest was also inscribed in the volume (Burt and Kudo, 1983; Barton, 1967:108–109fn, 120, 171). According to Barton (1968:115) ‘the cost book constituted in a small mine the only system of book-keeping considered necessary’. It is possible that some pursers were identified as accountants (or bookkeepers) in the CEBs.

An additional 130 accountants were engaged in the production and distribution of metals. Of these, 91 were involved in the iron and steel industry, 21 in tin and eight in copper. The most common occupational description here was accountant at/in iron works. One third of this sub-group were located in Wales at centres such as Merthyr Tydfil, tin plate works at Aberavon and copper works at Llanelli. Other concentrations were found in Darlington, Sheffield, Middlesbrough, the Black Country and Glasgow.

Some 129 accountants were employed in the

production and distribution of food, drink and tobacco; 60% of these were located in the south of England and 57 of this sub-group were employed in spirituous drink, primarily brewing. Indeed, ‘brewery accountant’ appears to have been a relatively distinctive occupation, though not in Scotland. Of the 63 accountants engaged in food industries, the most common occupation (n=20) was grocer’s accountant, some of whom were classed as servants to large stores. Others were engaged in the corn and flour trade and various other products such as tea, sugar, meat and fruit.

A further 39 accountants were employed in construction: 30 in house building and decorating (primarily in the south of England) and nine in shipbuilding and wagon building. Considering the contemporary importance of the industry, very few accountants (n=25) indicated employment in textiles and clothes production. In fact, the CEBs suggest that more ‘accountants’ were engaged in the distribution of textiles and clothing products (n=51) than their manufacture. Included here were 39 draper’s accountants, nine of whom were employed in a single establishment, Bainbridge & Co. department store, Newcastle, where the accountants were resident in a staff hostel on census night.

Among the remaining industries in which accountants were employed were paper (n=37) as in the cases of accountants to papermakers, publishers, newspapers and stationers; accountants at waterworks (n=16), accountants in the timber trade (n=9); chemicals (n=8); and in miscellaneous industries (n=27) ranging from the processing of wax, leather and manure to the manufacture of paint, china, glass and explosives.

Table 10 reveals significant differences in the economic and social status of the sub-occupational groups of employed accountants (as indicated

Figure 5
Spatial distribution of members of professional organisations, 1881

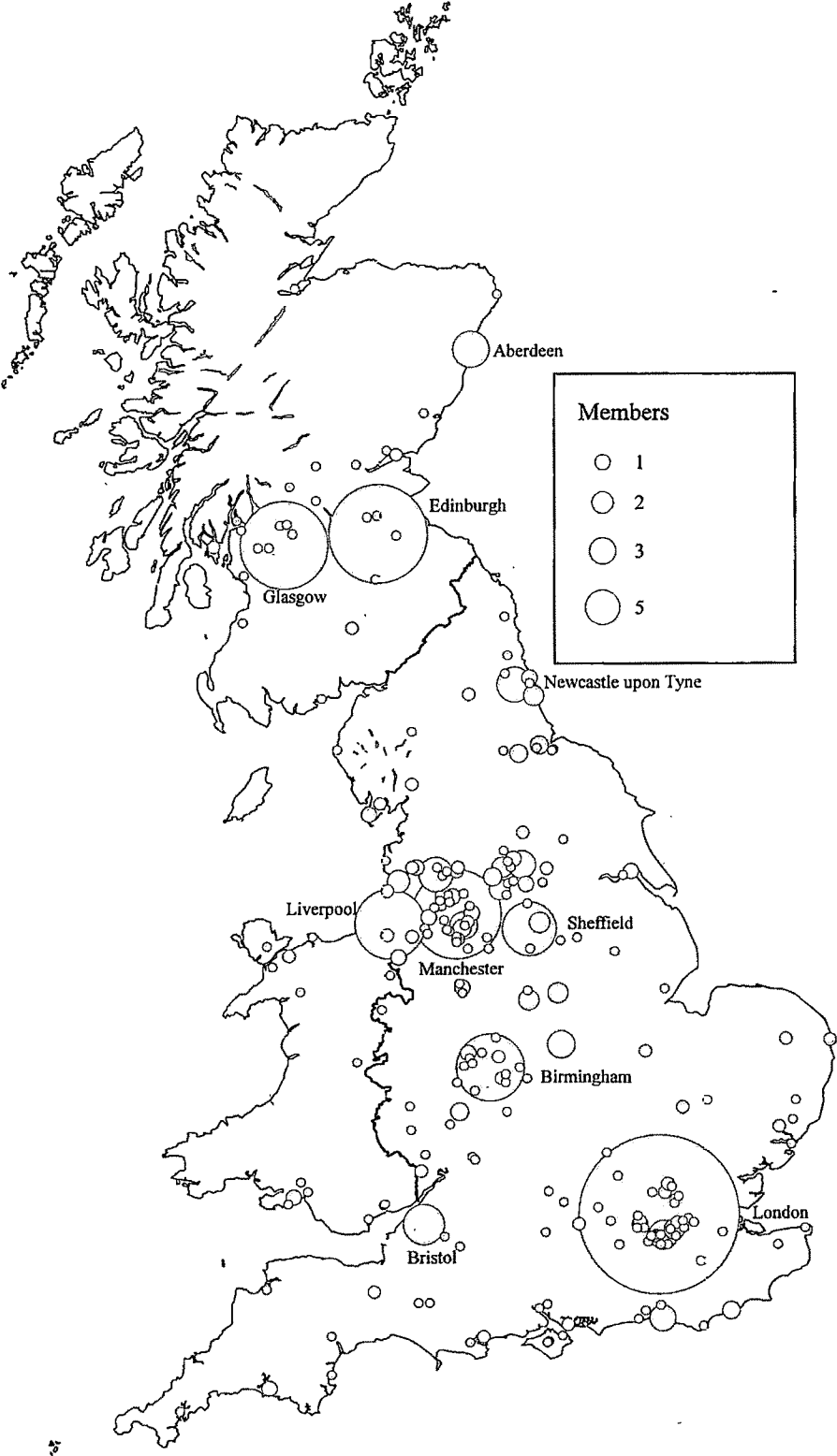


Table 11
Servant keeping among members and non-members of professional organisations

<i>Membership of professional organisation</i>	<i>Cases in database</i>	<i>Heads of households</i>	<i>Average domestic servants</i>	<i>% servant keeping</i>
Institute of Chartered Accountants in England and Wales only	932	743	1.6	84.3
Institute of Chartered Accountants in England and Wales and Scottish Institute of Accountants	19	15	1.5	93.3
<i>Total ICAEW</i>	<i>951</i>	<i>758</i>	<i>1.5</i>	<i>84.4</i>
<i>Scottish Institute of Accountants only</i>	<i>9</i>	<i>7</i>	<i>1.3</i>	<i>85.7</i>
Society of Accountants in Aberdeen	17	8	2.0	100.0
Society of Accountants in Edinburgh	125	69	2.9	98.6
Institute of Accountants and Actuaries in Glasgow	87	50	2.4	92.0
<i>Total Scottish chartered accountants</i>	<i>229</i>	<i>127</i>	<i>2.6</i>	<i>96.1</i>
Total members of professional organisations	1,189	892	1.7	86.2
Non-members of professional organisations	14,991	9,157	0.6	45.6
Total	16,180	10,049	0.7	49.2

by servant keeping). Accountants in the service of national government, bank accountants in England and Wales, and insurance accountants appear to have headed more prosperous households than those employed on the railways, in mines, metal works and draperies. Perhaps most surprising is the low rate of servant keeping among accountants connected with law firms and the courts.

6. Professional and non-professional accountants

There were 1,189 (7.3%) accountants in the database who were identified as members of the extant professional organisations (the ICAEW, chartered organisations in Aberdeen, Edinburgh and Glasgow, and the Scottish Institute of Accountants).⁵ Published directories and manuscript admission books of the professional bodies were utilised to identify members at the date of the census.

As contemporaries noted (Brown, 1905:335–336) and recent analysis has confirmed (Edwards et al., 2005) there were considerable variations in the spatial distribution of professional accountants. Although it should be noted that at least 9.2% of professional accountants are unlikely to have been at their usual place of residence on census night (being lodgers, boarders and visitors), as Figure 5 shows, practitioners were concentrated in particu-

lar areas. With the exception of significant numbers in Birmingham, Bristol and Newcastle upon Tyne where local accountants sought membership of the ICAEW following the grant of a royal charter in 1880, most professional accountants were located in the cities where the profession first organised: Edinburgh, Glasgow, Aberdeen, Liverpool, London, Manchester and Sheffield. Although one third of professional accountants were located in London and the south-east and one fifth in the north-west of England it was in Scotland that the greatest density of professional accountants was to be found (249, or seven per 100,000 population) followed by England (921, or four per 100,000) and Wales (19, or one per 100,000). The highest concentrations of professional accountants were to be found in Midlothian (29 per 100,000) and Lanarkshire (10 per 100,000). In England the highest densities were in the London region (seven per 100,000 in Middlesex and Surrey), the north-west (six per 100,000 in Cheshire and Lancashire) and Warwickshire (six per 100,000).

The data contained in Table 11 indicates a number of important findings from the snapshot of the occupation of accountant offered by the census taken on 3–4 April 1881. First, the great majority (92.7%) of those who described themselves as accountants in the CEBs were not members of professional organisations. Second, there were considerable variations in status, income and wealth between professional and non-professional accountants, at least as indicated by servant keeping. 86.2% of accountants who were members of professional organisations kept at least one ser-

⁵ For the purposes of comparison it may be stated that the number of members of the six major professional organisations resident in the British Isles at 31 December 2005 was 264,965. A further 85,045 members are located outside the UK and Ireland (Professional Oversight Board, 2006: 8–12).

vant. On average they employed 1.7 servants per household. By contrast, only 45.6% of non-professional accountants kept servants and where they did, the average per household was only 0.6. Therefore, one half of non-professional accountants who were heads of households appear not to have conformed to a major attribute of middle class status.

A demographic statistic also suggests this difference in the economic fortunes of professional and non-professional accountants. Among the Victorian middle classes marriage was deemed advisable only when personal economic resources were sufficient to support a wife, children and a household appropriate to one's status (Walker, 1988:209–218). The marital status of accountants contained in the database is known for the majority of cases. The data suggests that chartered accountants had greater financial security. Whereas 5.3% of chartered and 5.9% of non-chartered accountants were widowed, 68.9% of chartered compared to 58.8% of non-chartered accountants were married at census date.

Third, within the organised profession there were variations in status. Contemporaries often contrasted the high standing of accountants in Scotland with that of practitioners in England and Wales (Walker, 1988:12–21). The data in Table 11 tends to confirm this perception. It reveals that the average number of servants in the households headed by Scottish chartered accountants was 2.6 compared to 1.5 for members of the ICAEW.

Contemporaries and historians have also observed occupational and status differences between London and non-metropolitan chartered accountants. Events leading to the formation of the ICAEW in 1880 had revealed the 'sectionalism' which characterised the accountancy profession in England and Wales during the 1870s (Walker, 2004b:253–254; Edwards et al., 2005). Again, the London-provincial divide is borne out by the data. The average number of domestic servants employed by ICAEW members located in the London counties of Middlesex, Surrey and Kent was 1.9 compared to 1.4 for those located in other parts of England and Wales. In Lancashire and Yorkshire, where the provincial organisations which merged with the London based bodies in 1880 had been located, the averages were only 1.2 and 1.3 respectively.

Among accountants who were not members of professional organisations there were also some less marked regional variations in rates of servant keeping. In Scotland the average number of servants was 0.7, in the south-east of England it was 0.6. However, in Northern England and in Wales the average was 0.5. There were also variations according to the employment status of the accountant. The average number of domestic servants in households headed by accountant clerks was only

0.4 compared with 0.7 for those classed as accountants, and 0.8 for employee accountants and accountants with multiple occupations.

6.1. *Use of credentials*

A central tenet of the professionalisation projects of the accountancy organisations formed in Britain during the second half of the 19th century was instituting defining nomenclatures such as 'chartered accountant', ACA, FCA and CA. In the absence of statutory registration of the profession credentialism was essential to the pursuit of market dominance and social closure (Walker, 1991). The professional organisations were anxious to encourage the use by their memberships of credentials. The occupational descriptions contained in the CEBs offered by professional accountants in the privacy of their homes provide insights to the extent to which defining descriptions were internalised.

The data contained in Table 12 indicates that less than half of professional accountants who combined accounting with another occupation referred in the CEBs to their membership of a chartered body (Walker, 1991). The table also indicates a higher predilection by chartered accountants in Scotland to use professional designations than their counterparts in England and Wales. It should be remembered here that the chartered societies in Edinburgh, Glasgow and Aberdeen had been established in 1853 and 1866 respectively, and the ICAEW was formed and assumed defining credentials in 1880, shortly before the census was taken. That said, it was surprising to discover that the first two Presidents of the ICAEW, William Turquand and Robert Palmer Harding, were merely described in the census as 'accountant' and the third President, Arthur Cooper was a 'public accountant'.

Within Scotland there was also a reduced inclination to indicate membership of a professional body among members of the Glasgow Institute, where the joint-occupation of stockbroking was often pursued. In Edinburgh the defining credential of members of the local accountancy body was so established that a number of accountants simply entered 'CA' on the census form. In 1897 James Martin wrote of 'CA' that the letters 'are at best but a professional designation. But you see them used in all sort of ways in their private life and conduct. They put them upon their intimations of births, their marriages and deaths, nay, even on their tombstones' (Martin, 1897). The distinctive localism and varied status of the chartered societies in Scotland was also indicated by those who added 'in Aberdeen', 'in Edinburgh' or 'in Glasgow' to their occupational descriptions.

Perhaps most surprising is the large number of individuals (337), included in the 'accountant' category, eligible to indicate their membership of a

Table 12
Members of organisations of chartered accountants who referred to designatory letters, ‘Chartered Accountant’, or organisational membership in the CEBs, 1881

<i>Professional organisation</i>	<i>Chartered accountants in the database</i>	<i>Indicated professional status</i>	<i>% who indicated professional status by occupational category</i>			<i>Total</i>
			<i>Accountants</i>	<i>Multiple occupation</i>	<i>Other</i>	
<i>Society of Accountants in Aberdeen</i>	17	16	92.9	100.0	–	94.1
<i>Society of Accountants in Edinburgh</i>	125	112	93.8	58.3	0	89.6
<i>Institute of Accountants and Actuaries in Glasgow</i>	87	68	80.0	70.6	–	78.2
<i>Total Scottish Chartered Accountants</i>	229	196	88.8	68.8	0	85.6
<i>Institute of Chartered Accountants in England and Wales</i>	951	586	64.0	36.5	18.2	61.6
Total	1,180	782	68.5	47.4	16.7	66.3

professional organisation but chose not to. Of these cases, 76.6% were simply referred to in the census as 'accountant', a few were entered as 'professional accountant' and 'certified accountant'. Edwards et al. (2007) have illustrated the significance of the description 'public accountant' in England and Wales. Indeed, 20.2% (members of the ICAEW) were identified in the CEBs as 'public accountant' suggesting that at the time of the formation of the professional organisations in England and Wales, the 'in practice'/employee distinction was central to occupational and professional identity. 'Public accountant' is how important members of the early ICAEW, such as Arthur Cooper and Edwin Guthrie, were designated in the census. The contemporary significance of the term 'public accountant' is also indicated by the fact that 14 ICAEW members who did refer to their membership of the Institute also used 'public' in their occupational description. Examples include 'Public (Chartered) Accountant', 'Public Accountant ACA' and 'Public Accountant and Fellow of ICAEW'. By contrast, members of the accountancy bodies in Scotland were primarily identified in the CEBs as 'chartered' rather than public accountants by 1881.

Although 38.4% of members of the ICAEW and 14.4% of Scottish chartered accountants contained in the database did not indicate their chartered status in the CEBs there were others who seemed determined to take advantage of it. There were 29 individuals in the database who were not members of the chartered organisations at census date but entered as chartered accountants. In a number of cases it is possible that the occupation was wrongly entered in the census; the individual was an apprentice chartered accountant or a discharged apprentice whose membership was imminent, or the individual was a clerk to a chartered accountant. In one or two cases in Scotland it appears that the accountant had failed to complete an apprenticeship but indicated membership of a professional body. There is also one example of a former member who continued to use a professional designation. William Cowan was described in the census as a chartered accountant. He had been admitted to the Institute of Accountants and Actuaries in Glasgow in December 1853 but was removed from the list of members in 1868 for non-payment of subscriptions (Stewart, 1977:72). There are other instances where the 'chartered accountant' appears to have no current or former affiliation with a professional body. For example, Richard H. Fitzgerald, from Dublin, aged 27 and a boarder in the home of a solicitor in Islington.

7. Conclusions

The main findings of this study and their implications for understandings of the problems of occupational definition and inter-organisational conflict in the British accountancy profession are now considered.

Regional analysis reveals that the highest densities of accountants in Great Britain in April 1881 were found in the south of England and Wales, particularly the region bordering the Bristol Channel and Severn Estuary. Local analysis shows that accountants were concentrated in ports, major administrative and commercial centres and county towns, locations associated with metal manufacturing and processing, and watering places. Interestingly, comparatively low densities of accountants were found in northern centres of textile manufacturing – these were areas with high concentrations of bookkeepers. It is speculated that these spatial variations reflected socio-cultural differences in the meaning of the word 'accountant'. Regionalised occupational descriptions may have been sustained by communication, business and social networks. It is also suggested that the concentration of accountants in ports and certain mining districts may have reflected the accounting associated with socialised capital in the extractive and shipping industries. A gender dimension is also discernible. The use of the description 'accountant' appears to have been more frequent in counties where bookkeeping was feminised. Here then we have a portrayal of a loosely defined occupation where boundaries and meanings were obscure and varied over space.

Only 1.2% of accountants in 1881 were women and the majority of these were unmarried or widowed. Female accountants were mostly located in the south of England and employed in retailing and distribution. Although the number of women accountants identified was higher than in studies based on published census reports, they were insufficient to question the assumption that the occupation was gendered male during the late 19th century. However, the presence of women accountants confirmed that the occupational title could be employed without restriction – during a period when professional occupations were characterised by exclusively male composition and gentlemanly character.

The analysis of CEBs for 1881 reveals considerable diversity in the occupational identities and employment statuses of those entered as accountants. It is also abundantly clear that the traditional research focus on the work of the profession (particularly on insolvency and auditing) and practice firms veils the performance of a vast array of tasks by the wider accountancy populace operating in manifold organisations.⁶ The common descriptor, 'accountant', embraced a variety of occupational

⁶ For summaries of research findings on the work of professional accountants during the period covered by this study see Boys (1994: 37–42) and Matthews et al. (1998: 30–36; 93–112).

statuses and more specific identities (such as chartered, public, certified, professional, private, general, commercial, financial, consulting, female and statistical accountants) served to complicate and confuse the occupational terrain. Such variations would have rendered occupational definition and professional organisation complex during the late 19th century. In the study, 71.3% of the population was classified as 'accountants', a further 6.4% revealed in the census that they combined accounting with another occupation, 16.2% specifically indicated that they were employee accountants and 6.1% used descriptions that linked them to the performance of routine accounting functions. This contrasted with the application of specialist knowledge and independent practice associated with professionalism.

Studying accountants with multiple occupations also reveals spatial variations in occupational specialisation and obscure jurisdictional boundaries, both of which complicated identification of the scope of the occupation and the limits of the profession. While some accountants practised the craft in combination with occupations that may be considered complementary, or in reasonably close proximity to accounting (such as actuaries, agents, factors, brokers, collectors and company secretaries), others (such as retailers, merchants, farmers, journalists and craftsmen) were some remove from the core knowledge usually associated with the vocation. The data suggests that some of the other occupations pursued by accountants, particularly, stockbroking, were highly lucrative. Perhaps this explains why accountants in centres such as Glasgow and Sheffield were keen to include such work within definitions of professional practice while critics perceived it as 'trade'.

The majority of accountants who were known to be employees worked in the commercial sector rather than in industry. The study has revealed some distinctive sub-occupations which have tended to escape the attention of previous commentators. The presence of sub-occupations also complicated the definition of occupational boundaries. Sub-occupations included bank accountants (there were separate vocations in England and Wales, and Scotland), railway accountants, mine accountants, naval accountants, civil service accountants and accountants in local government. Interestingly, only the latter group attempted to institutionalise their distinctive collective identity through professional organisation (in the form of the Corporate Treasurers' and Accountants' Institute (later CIPFA) in 1885).

The findings reported in the paper confirm the elitist character of early professional organisation and the creation of a large community of excluded 'outs' by 1881. Only 7.3% of the accountants in the database have been identified as members of

the professional organisations extant on census night. The greatest density of professional accountants was found in Scotland and in Edinburgh and Glasgow in particular. In England professional accountants were concentrated in areas represented by the organisations which formed in the 1870s, in London and the north-west of England. However, there were also high densities in Warwickshire, where no local organisation had been constituted but was the source of a significant number of entrants to the ICAEW from 1880. The study reveals considerable variations in status between professional and non-professional accountants, perhaps indicating why non-organised groups were anxious to gain access to the rewards of institutionalisation and the use of defining credentials, as epitomised by the emergence of several organisations of accountants from the mid-1880s.

As contemporaries suggested, there were variations in status within the organised accountancy profession, and these inform our understanding of the intra-professional conflicts which could later frustrate registration and merger attempts. Most notable were the socio-economic differences between Scottish and English chartered accountants and, within the latter, the superior status of London compared to provincial chartered accountants. In 1881 English chartered accountants were yet to secure the full fruits of market advantage provided by the recent formation of the ICAEW. Indeed, many still referred to themselves in the census as 'public' rather than chartered accountants. By contrast members of the Edinburgh, Glasgow and Aberdeen societies had benefited from the usage of defining credentials since the 1850s and '60s.

The foregoing spatial, demographic and occupational analysis offers a snapshot of accountants in Britain in 1881. The results portray a diverse and ill-defined craft, one which encompassed considerable variations in employment and social status. It is not surprising that organising this disparate occupational community was to prove so partial and complex and that the structures which did emerge served to institutionalise divisions and perpetuate intra-professional conflicts for generations to come.

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Call for papers for a special issue of *Accounting, Auditing and Accountability Journal*: “Accounting and the Visual”

This special issue aims to contribute to a recent and steadily growing interest in organizational visual images and methodologies with particular application to the field of accounting. In essence, the practices of accounting for and auditing organizational activity relate to visualisation – rendering tangible and intangible values visible in the form of reports, charts, graphs, diagrams, and pictures for instance. These artefacts can fruitfully be studied from a visual perspective as being traces of – and drivers for – organizational action, processes and culture, as indeed can organizational artefacts more generally. Likewise, the changing image of accounting as a profession can be read visually, for example trends in corporate architecture, space and accountants’ professional identity.

The extent to which organisations trade on their image in such societies is also worthy of attention. Branding, organizational and/or corporate aesthetics management, and the construction of symbolically redolent buildings are all visual activities, and ways of accounting for the visual is also a theme we might usefully engage with. For example, in New Zealand, the ‘arts bonus points’ scheme allows organizations to gain more favourable planning decisions if they agree to invest in and display publicly accessible artworks in their buildings – importantly, these points are tradable, effectively creating a market that leads to the concept of an ‘aesthetic bottom line’ (Monin and Sayers 2006). In addition, accounting and management control processes can be studied visually through the use of documentary photography, photo-elicitation techniques and respondent-led photography.

In sum, as contemporary societies become defined by their ‘visual culture’ and technological advancements mean that ‘the image’ becomes all-important in every sphere of life, so organizational and accounting scholars must engage with these developments theoretically, empirically and methodologically. To date, the role of images and the visual world has been strangely overlooked in organizational research despite having a healthy provenance in the social sciences more generally, and a prominent profile across arts disciplines and associated cultural studies. This special issue aims to begin to rectify this neglect.

With these ideas in mind, we invite contributions that address *any* aspect of the visual and accounting, whether theoretical, empirical or methodological. We would particularly welcome creative, innovative approaches to the topic. An indicative, but not exhaustive, list of what we see as potential questions or approaches of interest is given below:

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- Visual images as historical records of accounting interest
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The submission deadline for this special issue is 1st March 2008, but earlier submissions are welcomed. Manuscripts should be sent electronically by email (in a word file format) to Dr Samantha Warren, University of Portsmouth (sam.warren@port.ac.uk). All papers will be reviewed in accordance with *AAAJ*’s normal processes. Authors are asked to follow *Accounting, Auditing & Accountability Journal*’s standard formatting requirements. For details, visit <http://www.emeraldinsight.com/info/journals/aaaj/notes.jsp>.

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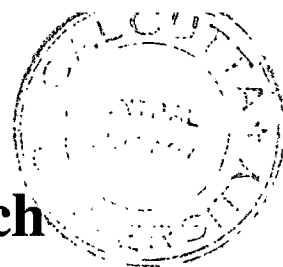
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All papers are subject to peer review on a double blind basis, either by members of the Editorial Board, or by invited reviewers of international standing. Reviewers are asked to comment in particular on the contribution, motivation and rigour of the analysis presented in the paper. The editor carries out an initial check that papers submitted comply with the guide to authors and advises authors where a paper has not met the essential criteria. Continuous monitoring of the review process aims at providing timely but informative feedback to authors. Subject to the recommendation of reviewers, research notes and commentaries may be published.

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In Memoriam: Harold Edey



Emeritus Professor Harold Edey died on 12 March 2007. He qualified as a chartered accountant in 1935 and, after war service in the Navy and a period as an investment analyst, he joined the London School of Economics (LSE) as lecturer in accounting and finance in 1949. He became Reader in Accounting in 1955 and Professor of Accounting in 1962–80. He was the School's first pro-director in 1967, and was also responsible for developing one of the first Masters courses in accounting in Britain, which is now the Masters in Accounting and Finance – the largest MSc programme in the School. A uniquely large proportion of British professors of accounting have been Harold's students at some point in their careers, and he made a point of encouraging young chartered accountants, including those like himself who had not attended university as full-time undergraduates, to enter academic accounting.

Harold was the first academic member of the Council of the Institute of Chartered Accountants in England & Wales (ICAEW), from 1969–1980, where he won respect through his service, communicating academic ideas to accountants in practice and industry. He was a member of the original Accounting Standards Steering Committee in the 1970s (the predecessor of today's ASB). In 1987, he was awarded the ICAEW's Founding Societies'

Award for his contribution to accounting research and higher education. He was elected as an honorary member of the Worshipful Company of Chartered Accountants in England & Wales.

Harold played a wider role in administration and educational developments beyond the University of London and the LSE. He was involved in the formative years of the Association of University Teachers of Accounting, which later became the British Accounting Association (BAA). The BAA awarded him its Lifetime Achievement Award in 2004. At the London Graduate School of Business Studies (now the London Business School) he was a member of the Academic Planning Board and a Governor. He was also Chairman of the Arts and Social Studies Committee of the CNAA and member of the Council, which recognised his contribution to higher education and to the discipline of accounting by conferring on him the degree of Doctor of Laws, *honoris causa*. He was an academic adviser to the independent University College of Buckingham (now the University of Buckingham) from its early days. He retired from LSE in 1980. Between 1980 and 1995 he was an Honorary Professor at the University College of Wales, Aberystwyth, while retaining a connection at the LSE. His interest in Celtic languages led to his learning Welsh and Cornish and his election as a Bard of the Cornish Gorseth (named Pedr An Mor) in 1933.

Edey's major academic interest was in financial accounting and reporting, its economic rationale and relationship to financial management, and the history of its interaction with the law. He also wrote about National Income accounting. His seminal papers included 'Accounting principles and business reality' (reprinted from *Accountancy* 1963 in Carsberg and Edey (eds.) *Modern Financial Management*, Penguin, 1969); 'The nature of profit' (*Accounting and Business Research*, 1970); 'Deprival value and financial accounting' (in Edey and Yamey (eds.) *Debits, Credits, Finance and Profits*, Sweet & Maxwell, 1974). These papers are still used in teaching at LSE.

Harold Edey published several books. His major papers are collected in Edey, H.C., *Accounting Queries* (New York and London: Garland, 1982). A festschrift in his honour, *External Financial Reporting* (LSE/Prentice-Hall), was edited by Professors Bryan Carsberg and Susan Dev in 1984.

Richard Macve
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IAS 29 and the cost of holding money under hyperinflationary conditions

Andrew Higson, Yoshikatsu Shinozawa and Mark Tippet*

Abstract—Empirical evidence is presented on the efficacy of procedures summarised in IAS 29: *Financial Reporting in Hyperinflationary Economies* for estimating the loss in purchasing power from holding monetary items during hyperinflationary periods. Our empirical analysis encompasses 32 hyperinflationary economies covering a wide variety of hyperinflationary conditions and spanning a period of more than 80 years. While the estimation procedures summarised in IAS 29 perform poorly under all the hyperinflationary conditions encompassed by our sample, they are especially poor when the rate of inflation accelerates towards the end of a relatively short hyperinflationary period. For these latter economies, our best estimate of the actual purchasing power loss is typically only a small fraction of the figure obtained under the IAS 29 procedures. For hyperinflations of longer duration, the IAS 29 procedures return estimated purchasing power losses that are typically around 10% larger than our best estimate of the actual losses. We also derive and empirically test a general class of 'two point' estimation formulae that make more efficient use of the sparse information set on which the IAS 29 estimation procedures are based. The results obtained from this procedure are encouraging and suggest it is possible to obtain reliable estimates of purchasing power losses using only sparse information sets provided realistic assumptions are made about the way monetary holdings respond to variations in the purchasing power of the currency.

Key words: Hyperinflation; IAS 29; monetary items; quadrature (estimating) formula; purchasing power loss.

1. Introduction

Seigniorage is the process whereby governments print currency and exchange it at face value for the goods and services required to implement their spending programmes. Governments generally ensure that the rate of growth in the currency is roughly comparable with the rate of growth in general economic activity. However, there are numerous instances of weak and/or insipid governments that have relied almost exclusively on seigniorage to finance their spending programmes. In these cases the rate of growth in the currency normally far exceeds the rate of growth in general economic activity and the currency ends up being debased by hyperinflation. The most notorious example of this practice is provided by the German hyperinflation during the Weimar Republic after the First World War as it struggled to meet the reparation payments required of it under the Versailles Treaty. More recent examples of these hyperinflationary seigniorage practices are provided by Angola between 1996 and 2005, Belarus between 1995 and 2003, Madagascar between 1994 and 1996, Poland between 1990 and 1995, Romania between 1994 and 2002, Russia after the break-up of the Soviet Union in 1992, Turkey until the reform of the cur-

rency in 2005 and the Ukraine between 1993 and 1997. Hence, it is not unusual to encounter organisations that have to operate under hyperinflationary conditions and the International Accounting Standards Board (IASB) has endorsed the financial reporting standard IAS 29: *Financial Reporting in Hyperinflationary Economies* (IASB, 1989) to meet the unique financial reporting problems that arise in such environments.

IAS 29 does not establish an absolute rate of inflation at which hyperinflationary conditions will be deemed to prevail but instead sets out some general characteristics that indicate the presence of hyperinflation and under which the reporting provisions summarised in the standard are to be implemented. The characteristics include the observation (para. 3) that the 'general population' prefers to maintain its wealth in non-monetary assets or in monetary assets denominated in a relatively stable foreign currency; that interest rates on debt transactions are linked to the rate of change in prices while credit sales and purchases are made at prices which compensate for the expected loss in purchasing power over the credit period; and that the cumulative rate of inflation over the previous three years is approaching or exceeds 100%. When these conditions are satisfied, para. 8 of IAS 29 mandates that published corporate financial statements 'shall be stated in terms of the measuring unit current at the reporting date'. This means that the revenue and expense items appearing on an organisation's profit and loss statement will have to be restated by multiplying them by the

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ratio of the general price index at the end of the reporting period to the general price index at the time when the revenue was received or expense incurred. Likewise, the fixed assets appearing on an organisation's balance sheet will have to be restated by multiplying them by the ratio of the general price index at the balance sheet date to the general price index at the time when the fixed assets were acquired. However, IAS 29 also notes that organisations typically hold assets and liabilities denominated in the currency of the hyperinflationary economy (so called monetary assets and liabilities or monetary items) and these will rapidly decrease in purchasing power as the hyperinflation eats away at their nominal value. Given this, para. 9 of IAS 29 also mandates that the net gain or loss in purchasing power from holding these monetary assets and liabilities must be included in the organisation's profit or loss and separately disclosed.

Unfortunately, IAS 29 provides only limited guidance about how the gain or loss from holding these monetary items is to be estimated, suggesting instead that (para. 10) 'consistent application of these ... procedures and judgements' employed in estimating the gain or loss in purchasing power 'is more important than the precise accuracy of the resulting amounts included in the restated financial statements'. However, if shareholders and others are to make effective assessments about how well organisations have managed their monetary assets and liabilities and the purchasing power gains and losses that arise from them (both in ab-

solute terms and in comparison with other organisations) then it is important that the gain or loss from holding monetary items reported on an organisation's profit and loss statement be as accurate as possible.

This 'consistency rather than accuracy' principle that underscores the re-statement process summarised in IAS 29 no doubt informs the 'illustrative' examples appended to the statement by those countries which have sought to make their domestic accounting standards compatible with the standards issued by the IASB. The estimation procedures demonstrated in these illustrative examples are based on the premise that an organisation's monetary position¹ changes on just a few (typically, one or two) occasions over an annual reporting period and that in between these changes its monetary position remains constant.² However, there is a long line of empirical work beginning with Cagan (1956) which shows that organisations rapidly adjust their holdings of monetary items as the rate of inflation gains momentum.³ In the German hyperinflation referred to earlier, for example, Cagan (1956: 102) shows that real monetary holdings declined by over 90% in the period from July 1922 until October 1923 as a consequence of a monthly inflation rate which grew from 43% in July 1922 to over of 3,773% by October 1923.⁴ In such hyperinflationary environments, it is problematic whether an organisation's monetary holdings over the reporting period can be captured by the one or two observations of that variable on which the IAS 29 estimation procedures are invariably based. This in turn means that the IAS 29 estimation procedures will form an unreliable basis for assessing the efficiency (or otherwise) with which organisations manage the purchasing power gains and losses that arise on their monetary assets and liabilities.

Given this, our purpose here is twofold. First, we use data from 32 hyperinflationary economies spanning an 80-year period to assess the relative efficiency of the procedures summarised in IAS 29 for estimating purchasing power gains and losses under a broad range of hyperinflationary environments. Our empirical analysis shows that the estimation procedures summarised in IAS 29 perform poorly, but especially so when the rate of inflation accelerates towards the end of a relatively short hyperinflationary period. For these latter economies, our best estimate of the actual purchasing power loss is typically only a small fraction of the figure obtained under the IAS 29 procedures. For hyperinflations of longer duration, the IAS 29 procedures return estimated purchasing power losses that are typically around 10% larger than our best estimate of the actual losses.

Our second contribution lies in the development of more sophisticated approaches for estimating

¹ An organisation's monetary position or equivalently its monetary items, is its monetary assets less its monetary liabilities. While an individual organisation's monetary position can be positive or negative (depending on whether its monetary assets exceed its monetary liabilities) for the economy as a whole the aggregate monetary position must be negative since someone has to hold the currency issued by the government. See Lucas (2000:247) for further discussion of this point.

² A good example of this practice is to be found in the numerical example appended to International Public Sector Accounting Standard *IPSAS 10: Financial Reporting in Hyperinflationary Economies* which is available from the following website:

http://www.ifac.org/Members/Source_Files/Public_Sector/IPSAS10.PDF

Other countries which have adopted IASB standards have also followed this practice. For example, until recently the Australian Accounting Standards Board appended the IPSAS 10 numerical example to *AASB 129: Financial Reporting in Hyperinflationary Economies* which is the Australian equivalent of IAS 29. AASB 129, complete with the IPSAS 10 numerical example, may be viewed at the following website:

[http://www.comlaw.gov.au/ComLaw/Legislation/LegislativeInstrument1.nsf/0/BF20E8CBE34CD250CA25700300244CCA/\\$file/AASB129_07-04c.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/LegislativeInstrument1.nsf/0/BF20E8CBE34CD250CA25700300244CCA/$file/AASB129_07-04c.pdf)

³ See Lucas (2000) for a summary of this literature.

⁴ An organisation's real monetary position is the book value of its monetary items divided by the price index used to calculate the gain or loss in purchasing power arising on its monetary items. It is, in other words, equivalent to the 'purchasing power' of the firm's monetary items.

the purchasing power gains and losses that arise on monetary holdings. These more sophisticated procedures invoke the assumption that organisations rapidly adjust their monetary holdings as the rate of inflation gains momentum in contrast to the estimation procedures summarised in IAS 29, which make the unlikely assumption that organisations adjust their monetary holdings on just one or two occasions over a given hyperinflationary period. Moreover, our empirical analysis shows that the estimated purchasing power losses under these more sophisticated techniques are typically within 2.5% of our best estimate of the actual purchasing power losses. This result has the important implication that it is possible to obtain reliable estimates of purchasing power losses using only the sparse information set on which the IAS 29 estimation procedures are typically based provided realistic assumptions are made about the way organisations adjust their monetary holdings in response to variations in the purchasing power of the currency on issue.

We commence our analysis in the next section by summarising the numerical procedures we use for determining our 'best estimates' of the actual purchasing power losses that arise on the hyperinflationary economies employed in our empirical analysis. We then illustrate the practical application of these procedures by determining our best estimates of the actual losses in purchasing power on the currency on issue for the US and the UK for each year over the period from 1990 until 2005. Our calculations show that the procedures endorsed by IAS 29 return systematically biased estimates of the purchasing power losses on the currencies of both countries when compared to our best estimates of the actual purchasing power losses. Fortunately, the estimation errors are not particularly large – typically, 3–4% of our best estimate of the actual figure. However, the systematic nature of the errors suggests that were the IAS 29 procedures to be applied to the data of hyperinflationary economies then errors of a considerably larger magnitude would be incurred. Section 3 explores this latter issue in further detail by comparing the estimated purchasing power losses for our 32 hyperinflationary economies under the IAS 29 procedures with our best estimate of the actual purchasing power losses. In Section 4 we derive and then empirically evaluate a general class of 'two-point' estimation formulae that make more efficient use of the sparse information set on which the IAS 29 estimation procedures are typically based. As previously noted, while this two-point estimation procedure is based on the same infor-

mation set as the IAS 29 estimation procedures, our empirical analysis shows that the two-point procedure provides much more reliable estimates of the purchasing power losses arising on the hyperinflationary economies examined in our empirical work. Our analysis concludes in Section 5 by summarising our main results and briefly examining their implications for the quality of earnings reported by firms that have to operate under hyperinflationary conditions.

2. Estimation procedures

Cagan (1956: 78) notes that inflationary seigniorage policies reduce the purchasing power of the currency and thereby impose a tax on all who have money or have money owed to them. One can illustrate this point by dividing a typical reporting year into n subintervals of equal length and supposing that an organisation's net monetary position (monetary assets less monetary liabilities) at the beginning of the j^{th} of these subintervals amounts to $m(\frac{j-1}{n})$ pounds. Then if $P(\cdot)$ is an index of prices, the loss (or gain) in purchasing power over this j^{th} subinterval will be approximately

$$m(\frac{j-1}{n}) \cdot \frac{P(\frac{j}{n}) - P(\frac{j-1}{n})}{P(\frac{j-1}{n})}.$$

Furthermore, one can re-state this loss (or gain) in purchasing power in terms of the price level which prevails at the end of the reporting year, in which case it follows that

$$P(1) \cdot \frac{m(\frac{j-1}{n}) \cdot \frac{P(\frac{j}{n}) - P(\frac{j-1}{n})}{P(\frac{j-1}{n})}}{P(\frac{j}{n})}.$$

is the approximate loss in purchasing power over the j^{th} sub-interval in end of reporting year prices. Summing these calculations over all n subintervals and letting $n \rightarrow \infty$ shows that the loss in purchasing power will be identically equal to

$$P(1) \int_0^1 \frac{m(t)}{P(t)} \cdot \frac{P'(t)}{P(t)} dt = P(1) \int_0^1 \frac{m(t)}{P(t)} \cdot d \log[P(t)].^5$$

Of course the difficulty here is that over any given year the index of prices, $P(t)$, and the real holding of monetary items, $\frac{m(t)}{P(t)}$, are observed at a small number of points only. In between these points, one has to infer somehow what the monetary position and the index of prices might have been.

Probably the most useful and best documented way of addressing numerical integration problems like this is to approximate the real monetary position, $\frac{m(t)}{P(t)}$, and the logarithm of the index of prices, $P(t)$, by interpolating polynomials based on the

⁵ See Willett (1987, 1989) and Ijiri (1976) for an account of how a firm's double-entry bookkeeping system may be represented in terms of the net inflow/outflow of its monetary items.

Table 1**Formulae for estimating purchasing power gains and losses on monetary items***First-degree interpolation formula*

$$P(1) \int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] \approx \frac{P(1)}{2} \sum_{j=1}^{12} \left[\frac{m(\frac{j-1}{12})}{P(\frac{j-1}{12})} + \frac{m(\frac{j}{12})}{P(\frac{j}{12})} \right] \log \left[\frac{P(\frac{j}{12})}{P(\frac{j-1}{12})} \right]$$

Second-degree interpolation formula

$$P(1) \int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] \approx \frac{P(1)}{6} \sum_{j=1}^6 \left\{ \left[\frac{3m(\frac{2j-2}{12})}{P(\frac{2j-2}{12})} + \frac{4m(\frac{2j-1}{12})}{P(\frac{2j-1}{12})} - \frac{m(\frac{2j}{12})}{P(\frac{2j}{12})} \right] \log \left[\frac{P(\frac{2j-1}{12})}{P(\frac{2j-2}{12})} \right] + \left[-\frac{m(\frac{2j-2}{12})}{P(\frac{2j-2}{12})} + \frac{4m(\frac{2j-1}{12})}{P(\frac{2j-1}{12})} - \frac{3m(\frac{2j}{12})}{P(\frac{2j}{12})} \right] \log \left[\frac{P(\frac{2j}{12})}{P(\frac{2j-1}{12})} \right] \right\}$$

Third-degree interpolation formula

$$P(1) \int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] \approx \frac{P(1)}{80} \sum_{j=1}^4 \left\{ \left[\frac{40m(\frac{3j-3}{12})}{P(\frac{3j-3}{12})} + \frac{57m(\frac{3j-2}{12})}{P(\frac{3j-2}{12})} - \frac{24m(\frac{3j-1}{12})}{P(\frac{3j-1}{12})} + \frac{7m(\frac{3j}{12})}{P(\frac{3j}{12})} \right] \log \left[\frac{P(\frac{3j-2}{12})}{P(\frac{3j-3}{12})} \right] + \right. \\ \left. \left[\frac{-17m(\frac{3j-3}{12})}{P(\frac{3j-3}{12})} + \frac{57m(\frac{3j-2}{12})}{P(\frac{3j-2}{12})} + \frac{57m(\frac{3j-1}{12})}{P(\frac{3j-1}{12})} - \frac{17m(\frac{3j}{12})}{P(\frac{3j}{12})} \right] \log \left[\frac{P(\frac{3j-1}{12})}{P(\frac{3j-2}{12})} \right] + \left[\frac{7m(\frac{3j-3}{12})}{P(\frac{3j-3}{12})} - \frac{24m(\frac{3j-2}{12})}{P(\frac{3j-2}{12})} + \frac{57m(\frac{3j-1}{12})}{P(\frac{3j-1}{12})} - \frac{40m(\frac{3j}{12})}{P(\frac{3j}{12})} \right] \log \left[\frac{P(\frac{3j}{12})}{P(\frac{3j-1}{12})} \right] \right\}$$

Fourth-degree interpolation formula

$$P(1) \int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] \approx \frac{P(1)}{1890} \sum_{j=1}^3 \left\{ \left[\frac{945m(\frac{4j-4}{12})}{P(\frac{4j-4}{12})} + \frac{1472m(\frac{4j-3}{12})}{P(\frac{4j-3}{12})} - \frac{804m(\frac{4j-2}{12})}{P(\frac{4j-2}{12})} + \frac{384m(\frac{4j-1}{12})}{P(\frac{4j-1}{12})} - \frac{107m(\frac{4j}{12})}{P(\frac{4j}{12})} \right] \log \left[\frac{P(\frac{4j-3}{12})}{P(\frac{4j-4}{12})} \right] + \right. \\ \left[\frac{-527m(\frac{4j-4}{12})}{P(\frac{4j-4}{12})} + \frac{1472m(\frac{4j-3}{12})}{P(\frac{4j-3}{12})} + \frac{1308m(\frac{4j-2}{12})}{P(\frac{4j-2}{12})} - \frac{640m(\frac{4j-1}{12})}{P(\frac{4j-1}{12})} + \frac{277m(\frac{4j}{12})}{P(\frac{4j}{12})} \right] \log \left[\frac{P(\frac{4j-2}{12})}{P(\frac{4j-3}{12})} \right] + \\ \left[\frac{277m(\frac{4j-4}{12})}{P(\frac{4j-4}{12})} - \frac{640m(\frac{4j-3}{12})}{P(\frac{4j-3}{12})} + \frac{1308m(\frac{4j-2}{12})}{P(\frac{4j-2}{12})} + \frac{1472m(\frac{4j-1}{12})}{P(\frac{4j-1}{12})} - \frac{527m(\frac{4j}{12})}{P(\frac{4j}{12})} \right] \log \left[\frac{P(\frac{4j-1}{12})}{P(\frac{4j-2}{12})} \right] + \\ \left. \left[\frac{-107m(\frac{4j-4}{12})}{P(\frac{4j-4}{12})} + \frac{384m(\frac{4j-3}{12})}{P(\frac{4j-3}{12})} - \frac{804m(\frac{4j-2}{12})}{P(\frac{4j-2}{12})} + \frac{1472m(\frac{4j-1}{12})}{P(\frac{4j-1}{12})} + \frac{945m(\frac{4j}{12})}{P(\frac{4j}{12})} \right] \log \left[\frac{P(\frac{4j}{12})}{P(\frac{4j-1}{12})} \right] \right\}$$

This table summarises four formulae for estimating the purchasing power gains and losses that arise over an annual period on an organisation's monetary holdings. The formula in the first panel approximates the ratio of the organisation's monetary holdings to the price index, $\frac{m(t)}{P(t)}$, and the logarithm of the price index, $\log[P(t)]$, by linear (or first-degree) interpolating polynomials. The formula in the second panel approximates $\frac{m(t)}{P(t)}$ and $\log[P(t)]$ by quadratic (or second-degree) interpolating polynomials. The third panel is based on cubic (third degree) polynomial approximations while the fourth panel employs quartic (fourth-degree) polynomial approximations.

small number of points at which the exact values of these functions are known. The case for this particular approximating procedure is strong (Carnahan et al., 1969:2–3). For a start, the theory of polynomial approximations is well developed and fairly simple. Furthermore, most of the other functions that one might consider as potential candidates for approximation purposes (trigonometric, logarithmic, exponential functions, etc.) must themselves be evaluated using these polynomial approximation techniques. Finally, there are strong analytical reasons for believing that interpolating polynomials will provide ‘good’ approximations to the real monetary holdings and price index functions. Here, ‘good’ implies that the differences between the approximating polynomial and the function being approximated can be reduced to an arbitrarily small figure. The important result here is the Weierstrass Approximation Theorem, which under a minimal set of regularity conditions and in the present context, says that the real monetary holdings and price index functions can be approximated to any desired degree of accuracy by a particular interpolating polynomial (Carnahan et al., 1969:3). Moreover, this result is normally implemented by employing low order interpolating polynomial approximation formulae (Carnahan et al., 1969:77). Given this, in Table 1 we summarise some low order approximating formulae for the purchasing power gain or loss based on the assumption that both the price index and real monetary holdings are observed on a monthly basis throughout the reporting year.

The formula in the first panel of this table approximates $\frac{m(t)}{P(t)}$ and $\log[P(t)]$ by linear (or first

degree) interpolating polynomials. The formula in the second panel approximates $\frac{m(t)}{P(t)}$ and $\log[P(t)]$ by quadratic (or second degree) interpolating polynomials. The third panel is based on cubic (third degree) polynomial approximations whilst the fourth panel employs quartic (fourth degree) polynomial approximations. The Appendix provides further details about how these polynomial approximating formulae are determined.

One can demonstrate the application of these formulae by using them to estimate the loss in purchasing power for the currency on issue in the US and the UK. For the US the monetary aggregate M1 (currency, traveller’s checks, demand deposits and other checkable deposits) is taken to be the currency on issue whilst the inflation rate over any given period is determined from the Consumer Price Index (CPI).⁶ The M1 data were downloaded from the Federal Reserve Statistical Release website, <http://www.federalreserve.gov/releases/h6/hist/h6hist1.pdf>, while CPI data were downloaded from the Economagic website, <http://www.economagic.com/em-cgi/data.exe/blscu/CUUR0000AA0>. The results from applying the approximating formulae to these data are summarised in Table 2. The first column in this Table gives the year of the estimate while the next four columns contain the estimate of the loss in purchasing power on the currency using first, second, third and fourth-degree interpolating polynomial approximation. Thus, for the year ending 31 December 2005 the first, third and fourth-degree interpolation formulae estimate the purchasing power loss on the currency at \$46.21 bn while the third-degree formula returns a marginally higher estimate of \$46.23 bn. The final column of Table 2 contains the estimated loss in purchasing power computed by applying the procedures summarised in IAS 29. This procedure is based on para. 27 of IAS 29 and applies the appropriate rate of inflation to the currency on issue at the beginning and end of each year in accordance with the following formula:

⁶ M1 is the monetary aggregate which is normally employed in empirical work of the kind undertaken here. See, for example, Lucas (2000:248–252).

⁷ Simple algebraic manipulation shows that this formula may be re-stated as

$$m(0) \cdot \frac{P(1) - P(0)}{P(0)} + (m(1) - m(0)) \cdot \frac{P(1) - P(c)}{P(c)}$$

This shows that the loss in purchasing power is comprised of the rate of inflation over the entire year multiplied by the currency on issue at the beginning of the year plus the rate of inflation over the period from time c until the end of the year multiplied by the change in the currency on issue during the year. Moreover, one can take the derivative through this expression with respect to $P(c)$ and thereby show:

$$\frac{d \left\{ \int_0^1 \frac{m(t) P'(t)}{P(t) \cdot P(t)} dt \right\}}{dP(c)} = - \frac{m(1) - m(0)}{P^2(c)}$$

Now, in hyperinflationary economies the currency on issue at the end of any period $[m(1)]$ invariably exceeds the currency on issue at the beginning of the period $[m(0)]$ by a considerable margin in which case the above derivative is negative. Minimal regularity conditions will then imply that the loss (or gain) in purchasing power on an organisation’s monetary items will decline as $c \rightarrow 1$.

$$P(1) \int_0^1 m(t) \frac{P'(t)}{P^2(t)} dt =$$

$$P(1) \left[m(0) \int_0^c \frac{P'(t)}{P^2(t)} dt + m(1) \int_c^1 \frac{P'(t)}{P^2(t)} dt \right] =$$

$$\frac{P(1)}{P(c)} m(0) \cdot \frac{P(c) - P(0)}{P(0)} + m(1) \cdot \frac{P(1) - P(c)}{P(c)}$$

where c is some generally unknown number that lies between zero and one.⁷ This result is otherwise known as the (Weighted) Mean-Value Theorem for integrals (Apostol, 1967: 219–220) and will always

Table 2

Estimated loss in purchasing power on the monetary aggregate M1 for the US economy
(bn of 31 December 2005 dollars)

Year	Degree of interpolation				
	First \$bn	Second \$bn	Third \$bn	Fourth \$bn	IAS 29 \$bn
1991	36.73	36.76	36.73	36.76	37.75
1992	38.85	38.87	38.86	38.90	39.77
1993	39.06	39.05	39.05	39.06	39.97
1994	39.75	39.76	39.77	39.80	40.57
1995	37.66	37.68	37.66	37.67	38.40
1996	45.35	45.32	45.33	45.33	46.25
1997	22.54	22.54	22.54	22.55	23.20
1998	20.82	20.81	20.81	20.82	21.42
1999	33.57	34.66	33.89	33.97	35.35
2000	42.06	42.07	42.12	42.17	43.42
2001	18.68	18.70	18.71	18.71	18.42
2002	31.03	30.99	31.02	31.00	31.76
2003	24.79	24.82	24.81	24.84	25.30
2004	44.56	44.58	44.58	44.64	45.14
2005	46.21	46.23	46.21	46.21	47.39

This table summarises annual estimates of the loss in purchasing power on the US currency using the polynomial formulae details of which are to be found in Table 1. The column headed 'first' estimates the purchasing power loss using the first-degree (linear) interpolation formula; the column headed 'second' estimates the purchasing power loss using the second-degree (quadratic) interpolation formula; the column headed 'third' estimates the purchasing power loss using the cubic interpolation formula; the column headed 'fourth' estimates the purchasing power loss using quartic interpolation. The column headed 'IAS 29' estimates the purchasing power loss using the procedures endorsed by IAS 29: *Financial Reporting in Hyperinflationary Economies*. Data for the monetary aggregate, M1, were downloaded from the Federal Reserve Statistical Release website, <http://www.federalreserve.gov/releases/h6/hist/h6hist1.pdf>, while Consumer Price Index data were downloaded from the Economagic website, <http://www.economagic.com/em-cgi/data.exe/blscu/CUUR0000AA0>.

give the exact figure for the loss (or gain) in purchasing power on an organisation's monetary holdings provided one is able to specify the "correct" value of the parameter c . Unfortunately, there is no obvious way of either knowing or determin-

ing c in any specific inflationary environment and given this, a convention has arisen which lets $c = \frac{1}{2}$.⁸ Note that under this convention Table 2 shows that the IAS 29 procedures return an estimated purchasing power loss for the year ending 31 December 2005, which is over \$1bn higher than the estimated purchasing power losses under the polynomial formulae. Against this, the four polynomial approximation methods return almost identical estimates of the loss in purchasing power in any given year. Moreover, the IAS 29 procedures return estimates of the loss in purchasing power which, in all but one year (2001) are larger than those obtained from the four polynomial interpolation methods.

Table 3 summarises similar information relating to the loss in purchasing power on the U.K. currency. Again, the monetary aggregate M1 is taken to be the currency on issue and data for this variable were downloaded from the Bank of England website. Data for the UK Consumer Price index were downloaded from the UK National Statistics Office website. The results from applying the approximating formulae to the UK data are summarised in Table 3. The format of this table is the

⁸ See the 'illustrative example' appended to *IPSAS 10: Financial Reporting in Hyperinflationary Economies* and *AASB 129: Financial Reporting in Hyperinflationary Economies* referred to earlier. Earlier examples of this convention are provided by para. 232 of the now withdrawn US Financial Accounting Standards Board Statement #33: *Financial Reporting of Changing Prices* and the illustrative example provided in the Guidance Notes which accompany the (also withdrawn) U.K. Accounting Standards Committee's SSAP #16: *Current Cost Accounting*. However, it is not hard to contemplate situations in which this convention will lead to extremely poor estimates of purchasing power gains and losses. If an organisation operates under seasonal conditions – an ice-cream vendor, for example – then its monetary position at the height of the season ($m(\frac{1}{2})$) may bear little resemblance to its monetary position at the beginning ($m(0)$) and end of the season ($m(1)$). If, for example, the ice-cream vendor carries no monetary items out of season so that $m(0)=m(1)=0$ then the above formula estimates the purchasing power gain on his monetary items at nothing. However, since at the height of summer the ice-cream vendor has borrowed heavily to finance his trading activities, the purchasing power gain on his debt will be significant.

Table 3
Estimated loss in purchasing power on the monetary aggregate M1 for the UK economy
(£bn of 31 December 2005 dollars)

Year	Degree of interpolation				IAS 29 \$bn
	First \$bn	Second \$bn	Third \$bn	Fourth \$bn	
1991	16.68	16.58	16.68	16.64	16.64
1992	5.94	5.92	5.95	5.94	5.85
1993	5.98	5.96	5.98	5.96	5.87
1994	5.40	5.36	5.39	5.37	5.22
1995	8.13	8.07	8.10	8.07	7.78
1996	6.82	6.78	6.83	6.82	6.67
1997	5.85	5.86	5.90	5.88	5.59
1998	5.95	5.90	5.99	5.98	5.76
1999	4.98	4.98	5.00	4.99	4.77
2000	3.70	3.70	3.74	3.73	3.45
2001	5.58	5.51	5.61	5.60	5.03
2002	9.23	9.20	9.24	9.23	9.25
2003	7.43	7.39	7.45	7.43	7.55
2004	10.91	10.90	10.95	10.92	10.72
2005	13.74	13.67	13.75	13.72	13.69

This table summarises annual estimates of the loss in purchasing power on the UK currency using the polynomial formulae, details of which are to be found in Table 1. The column headed 'first' estimates the purchasing power loss using the first-degree (linear) interpolation formula; the column headed 'second' estimates the purchasing power loss using the second-degree (quadratic) interpolation formula; the column headed 'third' estimates the purchasing power loss using the cubic interpolation formula; the column headed 'fourth' estimates the purchasing power loss using quartic interpolation. The column headed 'IAS 29' estimates the purchasing power loss using the procedures endorsed by IAS 29: *Financial Reporting in Hyperinflationary Economies*. Data for the monetary aggregate, M1, were downloaded from the Bank of England website while Consumer Price Index data were downloaded from the UK National Statistics Office website.

same as that for Table 2. Note how this table again shows that the four polynomial interpolation methods return almost identical estimates of the loss in purchasing power on the currency. However, when the IAS 29 procedures are applied to the UK data they return a lower estimate of the loss in purchasing power on the currency than is the case with the polynomial approximation methods in all but two years (2002 and 2003). This is in direct contrast to the US results, where the IAS 29 procedures consistently return higher estimates of the loss in purchasing power on the currency.

One might argue that the systematic differences observed in these two tables are of little consequence since the deviations between the annual estimates obtained under the IAS 29 procedures and the polynomial approximation techniques are relatively small. For the US data, estimates obtained using the polynomial approximation formulae vary by no more than 4% from estimates obtained under the IAS 29 procedures. For the UK data, there are two years (2000 and 2001) where differences in the estimates are in excess of 8%. In other years, however, the differences are generally much less than 5%. Here, one must remember however that these differences have arisen in what can only

be described as modest inflationary environments. The average annual rate of inflation over the 15-year period ending 31 December 2005 was 2.6% for the US and a mere 2.1% for the UK. However, in the hyperinflationary environments envisaged by IAS 29 the cumulative rate of inflation over the previous three years will typically be of the order of 100% or more. It is questionable whether results obtained for the relatively low inflationary environments experienced in the US and UK can be replicated in the hyperinflationary environments envisaged by IAS 29. Given this, in the next section we use the data pertaining to 32 hyperinflationary economies and which between them encompass a wide variety of hyperinflationary environments covering a period of over eighty years, to make assessments about the relative efficiency of the procedures summarised in IAS 29 for estimating purchasing power gains and losses during hyperinflationary periods.

3. Data and empirical analysis

Our empirical analysis is based on the seven hyperinflations analysed by Cagan (1956) as well as a further 25 hyperinflationary economies for

Table 4
Summary statistics for hyperinflationary economies examined by Cagan (1956)

<i>Country</i>	<i>Purchasing power loss on the currency for year ended:</i>	<i>Average rate of inflation (per month)</i>	<i>First</i>	<i>Second</i>	<i>Third</i>	<i>Fourth</i>
Austria	August, 1922	0.50	0.7499	0.7427	0.7497	0.7412
Germany	November, 1923	38.04	0.0000	0.0000	0.0000	0.0000
Greece	October, 1944	10.16	0.0003	0.0003	0.0003	0.0003
Hungary (1)	February, 1924	0.40	1.1028	1.0933	1.0891	1.0906
Hungary (2)	July, 1946	3.49×10^{13}	0.0000	0.0000	0.0000	0.0000
Poland	January, 1924	0.77	0.0766	0.0745	0.0764	0.0742
Russia (1)	February, 1924	0.78	0.2011	0.2028	0.1998	0.2030
Russia (2)	February, 1923	0.28	0.5854	0.5819	0.5829	0.5834

The first and second columns in this table give the country and period over which the hyperinflation occurred. The third column summarises the average monthly rate of inflation over the duration of the given hyperinflation. Thus, the average rate of inflation for the Austrian economy in the year to August 1922 amounts to 50% (per month). Likewise, the average rate of inflation for the Polish economy in the year to January 1924 amounts to 77% (per month). The column headed 'first' gives the ratio of the estimated purchasing power loss based on the linear interpolation formula summarised in Table 1 to the estimate obtained using the IAS 29 procedures; the column headed 'second' gives the ratio of the estimated purchasing power loss based on the quadratic interpolation formula summarised in Table 1 to the estimate obtained using the IAS 29 procedures; the column headed 'third' gives the ratio of the estimated purchasing power loss based on cubic interpolation to the estimate obtained using the IAS 29 procedures; the column headed 'fourth' gives the ratio of the estimated purchasing power loss based on quartic interpolation to the estimate obtained using the IAS 29 procedures. The data on which this table is based are taken from Cagan (1956).

which data are available from the International Monetary Fund's website. Summary details of the hyperinflationary economies analysed by Cagan (1956) are contained in Table 4. Cagan (1956:26) shows that the first of these hyperinflations – namely, the Austrian hyperinflation – lasted for about a year and petered out towards the end of August 1922. The average rate of inflation over the year ending on this date was 50% (per month). The final four columns give the ratio of the estimated loss in purchasing power on the Austrian currency for the year ending August 1922 from applying the polynomial approximating formulae, to the estimated loss in purchasing power from applying the IAS 29 procedures. These ratios are all in the vicinity of 0.75, which implies that the estimates of the purchasing power loss using the polynomial approximating formulae are approximately 25% lower than the estimates obtained from using the IAS 29 procedures. Against this, Table 4 shows that the estimates of the loss in purchasing power on the Hungarian currency for the year ending February 1924 using the polynomial approximating formulae are about 9% larger than the estimated loss in purchasing power obtained from the IAS 29 procedures. With the exception of Russia, the

other statistics summarised in Table 4 are to be interpreted in the same way as those for the Austrian and Hungarian hyperinflations. The Russian hyperinflation began in December 1921 and concluded approximately 26 months later in February 1924.⁹ Given this, one can estimate the loss in purchasing power from holding the Russian currency for two annual periods. The first of these is for the year ending February 1923 for which the estimated losses in purchasing power under the polynomial approximating formulae are about 40% lower than the estimated purchasing power losses computed under the IAS 29 procedures. For the second of these periods – the year ending February 1924 – the estimated losses in purchasing power under the polynomial approximating formulae are about 80% lower than the estimated losses obtained from the IAS 29 procedures.

Overall, Table 4 shows that the IAS 29 procedures tend to return significantly larger estimates of the loss in purchasing power when compared with the polynomial approximating formulae. In six of the seven hyperinflations examined by Cagan (1956), Table 4 shows that the estimated loss in purchasing power on the currency is significantly lower under the polynomial approximating formulae than is the case with IAS 29 procedures. Indeed, for the German hyperinflation the polynomial estimate of the purchasing power loss on the currency is on average barely 0.000016% of the

⁹ The other six hyperinflations summarised in Table 4 all lasted for around a year or less.

estimate obtained from the IAS 29 procedures whilst for the Hungarian hyperinflation which concluded in July 1946, the polynomial estimate is on average just $4.33 \times 10^{-20}\%$ of the estimate obtained from the IAS 29 procedures. The root cause of these gigantic differences appears to lie in the fact that with the exception of the Greek hyperinflation, the inflation rate for each country accelerates towards the end of the hyperinflationary period and the real currency on issue declines instantaneously and dramatically in response to it. In other words, organisations adjust their monetary holdings in response to changes in the inflation rate much more frequently than the once or twice a year scenario envisaged by the IAS 29 procedures. One can see this more clearly from Table 5, which summarises an index of the real currency on issue during each month as well as the monthly rate of inflation and the price index for the Hungarian hyperinflation, which endured over the year to July, 1946 (Cagan, 1956: 110–111). Note how this table shows that by October 1945, the real value of the currency on issue was just a fourth of what it had been in July 1945 and that by January 1946, it was an eighth of what it had been just six months' earlier. In other words, when the

inflation rate is rapidly increasing organisations adjust their monetary holdings much more frequently than the one or two occasions envisaged by the IAS 29 procedures and so, they will more than likely return unreliable estimates of purchasing power losses as a consequence. The polynomial interpolating techniques, however, are based on the assumption that the real value of the currency on issue changes instantaneously in response to variations in the rate of inflation and therefore, they are unlikely to suffer from this problem. Given this, one should not be too surprised to see the large differences in the estimated purchasing power losses that are summarised in Table 4.¹⁰

Table 6 provides summary information relating to the 25 more recent hyperinflationary economies for which data are available from the International Monetary Fund's (IMF) website, <http://www.imfstatistics.org/imf/>. As with our estimates of the purchasing power losses for the UK and US, we take M1 to be the currency on issue (Lucas, 2000: 248–252) while the inflation rate over any given period is determined from the Consumer Price Index (CPI) for the particular country. The first two columns in Table 6 give the country and the period over which the hyperinflation was deemed

¹⁰ Using the polynomial formulae summarised in Table 1 shows that our best estimate of the loss in purchasing power on the Hungarian currency for the year to July 1946 amounts to

$$\int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] = 185.45$$

where the loss in purchasing power is stated in units of July 1946 purchasing power. Now, the weighted mean value theorem given earlier shows that the purchasing power loss has the following representation over this period:

$$\int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] = \frac{m(0)P(c) - P(0)}{P(0) \cdot P(c)} + \frac{m(1)P(1) - P(c)}{P(1) \cdot P(c)}$$

where c is some generally unknown parameter that lies between zero and unity. This means that if one follows the usual convention of letting $c = \frac{1}{2}$ one obtains the following estimate of the purchasing power loss for the Hungarian hyperinflation under the IAS 29 procedures:

$$\int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] = \frac{m(0)P(\frac{1}{2}) - P(0)}{P(0) \cdot P(\frac{1}{2})} + \frac{m(1)P(1) - P(\frac{1}{2})}{P(1) \cdot P(\frac{1}{2})} =$$

$$24.81 \times \frac{688.49 - 1}{688.49} + 0.08 \times \frac{3.81 \times 10^{27} - 688.49}{688.49}$$

or $24.77 + 4.29 \times 10^{23} = 4.29 \times 10^{23}$ in units of July 1946 purchasing power. From this it follows that the ratio of our best estimate of the purchasing power loss to the estimate of the purchasing power loss under the IAS 29 procedures is

$$\frac{185.45}{4.29 \times 10^{23}} = 4.33 \times 10^{-20}\%$$

as stated in the text. Here, however, Table 5 shows that the average monthly rate of inflation for the six months ending in July, 1946 is 6.98×10^{13} , a figure that far exceeds the rates of inflation for the months of February, March, April, May and June, 1946. This shows that the distribution of the monthly

rates of inflation is highly skewed and so a simple average of these rates of inflation provides a poor summary measure of the inflation rate over this period. Likewise, the inflation rate used to estimate purchasing power losses under IAS 29 over the six months ending in July, 1946 – namely,

$$\frac{P(\frac{1}{2}) - P(0)}{P(\frac{1}{2})} = \frac{3.81 \times 10^{27} - 688.49}{688.49} = 4.29 \times 10^{23}$$

– will also be a poor reflection of the rate of inflation over this period and will lead to the enormous errors documented for the Hungarian hyperinflation summarised in Table 4. We have previously shown, however, that one can address this problem by letting the unknown parameter $c \rightarrow 1$. Given this one can base the estimate of the loss in purchasing power in the Hungarian currency on the price index at the beginning of August 1945 (time zero), the price index at the end of June, 1946 (thereby setting $c = \frac{1}{2}$) and the price index at the end of July 1946 (time one). Using the data summarised in Table 5 we then have the following estimate of the purchasing power loss for the Hungarian hyperinflation:

$$\frac{m(0)P(\frac{1}{2}) - P(0)}{P(0) \cdot P(\frac{1}{2})} + \frac{m(1)P(1) - P(\frac{1}{2})}{P(1) \cdot P(\frac{1}{2})} =$$

$$24.81 \times \frac{9.08 \times 10^{12} - 1}{9.08 \times 10^{12}} + 0.08 \times \frac{3.81 \times 10^{27} - 9.08 \times 10^{12}}{9.08 \times 10^{12}}$$

or $24.81 + 3.25 \times 10^{13} = 3.25 \times 10^{13}$ in units of July, 1946 purchasing power. While this estimate is about half the figure obtained under the IAS 29 procedures (where, it will be recalled $c = \frac{1}{2}$), it is still substantially larger than our best estimate of the purchasing power loss (185.45) given earlier. This reflects the fact that the rate of inflation for July 1946 is gigantic when compared to the rates of inflation for the other months in the year ending in July 1946. This in turn means that the parameter c will have to be very close to but not quite equal to unity if the weighted mean value formula is to give a reliable estimate of the purchasing power loss for the Hungarian hyperinflation.

Table 5
Monthly inflation rates and index of real currency on issue for Hungarian hyperinflation ending in July 1946

<i>Month</i>	<i>Rate of inflation (per month)</i>	<i>Price index [P(t)]</i>	<i>Real currency [$\frac{m(t)}{P(t)}$]</i>
July, 1945	0.37	1.00	24.81
August	0.63	1.63	21.94
September	1.22	3.61	16.37
October	5.41	23.14	6.17
November	4.35	123.79	3.82
December	2.19	395.18	2.58
January, 1946	0.74	688.49	3.20
February	5.03	4,152.41	1.88
March	3.29	17,807.38	3.17
April	18.15	340,957.30	2.83
May	314.65	1.08×10^8	2.01
June	84,410.19	9.08×10^{12}	3.15
July	4.19×10^{14}	3.81×10^{27}	0.08

The first column in the table gives the month and year of the Hungarian hyperinflation, which concluded in July 1946. The second column gives the rate of inflation during the given month. Thus, the rate of inflation for the month of July, 1945 was 37% and the rate of inflation for the month of April 1946 was 1,815%. The third column summarises the price index constructed from the inflation rates given in the second column. Thus, the price index for the end of August 1945 is one plus the inflation rate during August 1945 or 1.63. The price index for September 1945 is one plus the inflation rate for September, 1945 multiplied by the price index for August, 1945 or $2.22 \times 1.63 = 3.61$. Likewise, the price index for October 1945 is one plus the inflation rate for October 1945 multiplied by the price index for September 1945 or $6.41 \times 3.61 = 23.14$. Finally, the last column is an index of the real currency on issue during the given month.

to have occurred. In conformity with para. 3 of IAS 29, a hyperinflationary period was deemed to commence at the beginning of any three-year period for which the accumulated rate of inflation exceeded 100%. The hyperinflationary period was deemed to have concluded at the end of any three-year period for which the accumulated rate of inflation had fallen below 100%. Thus, under these criteria the Argentinean hyperinflation was deemed to have commenced at the beginning of 1971 and continued for 23 years before petering out at the end of 1993. The next four columns give the average annual rate of inflation, the standard deviation of the annual rate of inflation and the minimum and maximum annual rates of inflation over this 23-year hyperinflationary period. This shows that the average rate of inflation during the Argentinean hyperinflation was 447.68% (per annum); that the standard deviation of the annual rate of inflation rate was 996.22%; that the maximum rate of inflation during this period was 4,923.32% (per annum) whilst the minimum rate of inflation was 7.36% (per annum). The other statistics summarised in Table 6 are to be interpreted in the same way as those for the Argentinean hyperinflation. Here we also need to emphasise that the data for some countries are incomplete (e.g. Democratic Republic of Congo, Russia and Zimbabwe among

others) and that this placed limits on the extent to which the relevant hyperinflations could be analysed.

Table 7 summarises the relative loss in purchasing power on the currency on issue for each of the 25 hyperinflationary economies for which data are available from the IMF website under the four polynomial approximating techniques as compared to those obtained from the simple IAS 29 estimation procedures. The first two columns in this table identify the country and duration of the hyperinflation. The third column summarises the number of years over which our analysis is based. Hence, for Argentina our analysis covers the 23-year period from 1971 to 1993. The next two columns give the median of the ratio of the loss in purchasing power from using the polynomial approximating techniques to the loss in purchasing power as calculated from the IAS 29 procedures. Thus, for the Argentinean hyperinflation the 23 ratios are ordered from smallest to largest for each of the four polynomial approximating techniques. The twelfth ordered ratio is the median and it is this statistic which is reported in Table 7 for each polynomial technique. Thus, these results show that for the Argentinean hyperinflation the median estimate of the purchasing power loss for the polynomial approximating techniques is about 10%

Table 6
Summary statistics for hyperinflationary economies with data available on the International Monetary Fund (IMF) website: <http://www.imfstatistics.org/imf/>

<i>Country</i>	<i>Period of hyperinflation</i>	<i>Average rate of inflation (per annum)</i>	<i>Standard deviation of rate of inflation</i>	<i>Maximum rate of inflation</i>	<i>Minimum rate of inflation</i>
Angola	1996–2005	2.7065	4.6465	16.5011	0.1853
Argentina	1971–1993	4.4768	9.9622	49.2332	0.0736
Belarus	1995–2003	1.1034	0.8637	2.5120	0.2540
Bolivia	1979–1988	11.1654	24.3383	81.7052	0.1066
Brazil	1980–1996	6.4424	7.3473	24.7714	0.0956
Chile	1968–1976	1.9008	1.8264	5.5862	0.1940
Congo, De R.	1976–1995	11.5316	24.2986	97.9689	0.1433
Dominican Re	1989–1991	0.4081	0.2973	0.7992	0.0790
Ecuador	1984–2002	0.4054	0.2143	0.9100	0.0936
Estonia	1993–1995	0.3537	0.0643	0.4165	0.2653
Israel	1974–1987	1.1032	1.1300	4.4488	0.1610
Jamaica	1991–1994	0.4433	0.2129	0.8019	0.2679
Madagascar	1994–1996	0.3560	0.2164	0.6122	0.0828
Mexico	1986–1990	0.7324	0.5225	1.5916	0.1970
Nicaragua	1988–1993	66.8353	90.8414	240.3105	0.0352
Peru	1976–1994	7.0490	17.7508	76.4975	0.1538
Poland	1990–1995	0.6995	0.7076	2.2587	0.2195
Romania	1994–2002	4.1650	0.3723	1.5142	0.1784
Russia	1998–2000	0.4704	0.2724	0.8438	0.2018
Suriname	1992–2002	1.0634	1.6377	5.8648	0.0122
Turkey	1977–2003	0.5912	0.2346	1.2025	0.1613
Ukraine	1993–1997	21.5756	40.0113	101.5503	0.1012
Uruguay	1976–1996	0.5866	0.2486	1.2895	0.2053
Venezuela	1987–1998	0.5002	0.2241	1.0324	0.2991
Zimbabwe	1998–2001	0.6771	0.2591	1.1207	0.4663

The first and second columns in the table give the country and period over which the hyperinflation occurred. The third and fourth columns summarise the average annual rate of inflation and the standard deviation of the annual rate of inflation over the duration of the given hyperinflation. Thus, the average annual rate of inflation for the Mexican economy was 73.24% with a standard deviation of 52.25%. The fifth and sixth columns give the maximum and minimum annual rates of inflation over the period of the hyperinflation.

lower than the purchasing power loss computed under the IAS 29 procedures. Furthermore, one can average the four polynomial estimates of the purchasing power loss and then divide this average by the estimate of the purchasing power loss obtained from the IAS 29 procedures. The final two columns give the number of these (average) ratios that are less than one and the number that exceed unity. Hence, for the 23 years on which our analysis of the Argentinean hyperinflation is based, there are 20 years in which this (average) ratio is less than one and only three years in which the (average) ratio exceeds one. The other statistics summarised in Table 7 are to be interpreted in the same way as those for the Argentinean hyperinflation.

Probably the most striking characteristic displayed by Table 7 is that for all but one country (namely, Belarus), the median ratios are less than unity. Indeed, of the 272 country-years on which

Table 7 is based, there are 229 occasions on which the ratio of the estimated purchasing power loss from the polynomial approximating formulae to the estimated loss under the IAS 29 procedures is less than unity, and only 43 occasions where the ratio exceeds unity. Moreover, a simple sign test rejects the null hypothesis that the median ratio for the 'population' of hyperinflationary economies is equal to unity at any reasonable level of significance [Conover (1971:121–126)]. This, of course, is compatible with the hypothesis that the polynomial-based formulae will tend to return lower estimates of purchasing power losses than will be the case with the IAS 29 procedures.

Here it is important to note, however, that for the more recent hyperinflationary economies extracted from the IMF website, the differences between the polynomial-based approximations of the purchasing power loss and those based on the IAS 29

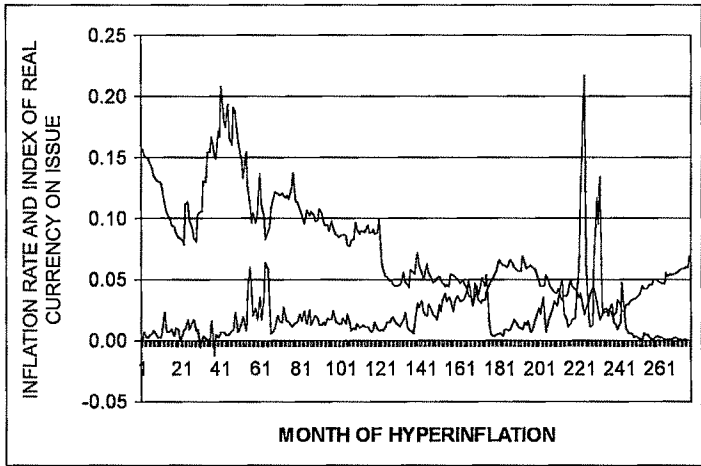
Table 7

Median ratio of the average of four polynomial estimates to the IAS 29 estimate of the annual purchasing power loss for hyperinflationary economies with data available on the International Monetary Fund (IMF) website: <http://www.imfstatistics.org/imf/>

Country	Period of hyperinflation	# Observations	First	Second	Third	Fourth	Ratios < 1	Ratios > 1
Angola	1996–2005	10	0.8210	0.8161	0.8135	0.8147	9	1
Argentina	1971–1993	23	0.8909	0.9021	0.8975	0.9035	20	3
Belarus	1995–2003	9	1.0239	1.0221	1.0217	1.0225	3	6
Bolivia	1979–1988	10	0.8647	0.8652	0.8647	0.8667	9	1
Brazil	1980–1996	17	0.8183	0.8139	0.8077	0.8122	15	2
Chile	1968–1976	9	0.9770	0.9834	0.9752	0.9853	6	3
Congo, De R.	1976–1995	20	0.9430	0.9445	0.9403	0.9428	13	7
Dominican Re	1989–1991	3	0.8807	0.8788	0.8790	0.8781	3	0
Ecuador	1984–2002	19	0.9190	0.9133	0.9155	0.9117	16	3
Estonia	1993–1995	3	0.9556	0.9555	0.9553	0.9567	3	0
Israel	1974–1987	14	0.9719	0.9740	0.9655	0.9755	9	5
Jamaica	1991–1994	4	0.9531	0.9487	0.9486	0.9468	3	1
Madagascar	1994–1996	3	0.9719	0.9743	0.9724	0.9769	3	0
Mexico	1986–1990	5	0.8494	0.8461	0.8477	0.8455	5	0
Nicaragua	1988–1993	6	0.9730	0.9661	0.9677	0.9602	4	2
Peru	1976–1994	19	0.9174	0.9175	0.9177	0.9181	19	0
Poland	1990–1995	6	0.9489	0.9467	0.9485	0.9466	4	2
Romania	1994–2002	9	0.8427	0.8392	0.8397	0.8394	9	0
Russia	1998–2000	3	0.9383	0.9365	0.9364	0.9369	3	0
Suriname	1992–2002	11	0.9797	0.9754	0.9808	0.9759	8	3
Turkey	1977–2003	27	0.8050	0.7984	0.8028	0.7958	27	0
Ukraine	1993–1997	5	0.9478	0.9441	0.9428	0.9428	4	1
Uruguay	1976–1996	21	0.8833	0.8773	0.8814	0.8779	21	0
Venezuela	1987–1998	12	0.9028	0.9014	0.8977	0.9012	11	1
Zimbabwe	1998–2001	4	0.9865	0.9855	0.9859	0.9843	2	2
TOTALS		272					229	43

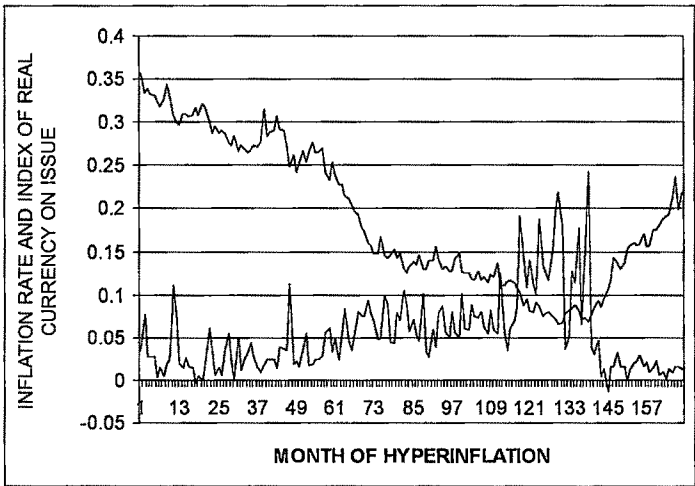
The first, second and third columns in the table give the country, the period and the number of years over which the hyperinflation occurred. The column headed 'first' gives the median ratio of the estimated purchasing power loss based on the linear interpolation formula summarised in Table 1 to the estimate obtained using the IAS 29 procedures; the column headed 'second' gives the median ratio of the estimated purchasing power loss based on the quadratic interpolation formula summarised in Table 1 to the estimate obtained using the IAS 29 procedures; the column headed 'third' gives the median ratio of the estimated purchasing power loss based on cubic interpolation to the estimate obtained using the IAS 29 procedures; the column headed 'fourth' gives the median ratio of the estimated purchasing power loss based on cubic interpolation to the estimate obtained using the IAS 29 procedures. The penultimate column gives the number of observations for which the simple average of the first, second, third and fourth interpolating ratios for each year is less than unity. The final column gives the number of observations for which the simple average of the first, second, third and fourth interpolating ratios for each year exceeds unity.

Figure 1
Index of real currency on issue and monthly rate of inflation for Argentinean economy from January 1971 (month 1) until December 1993 (month 276)



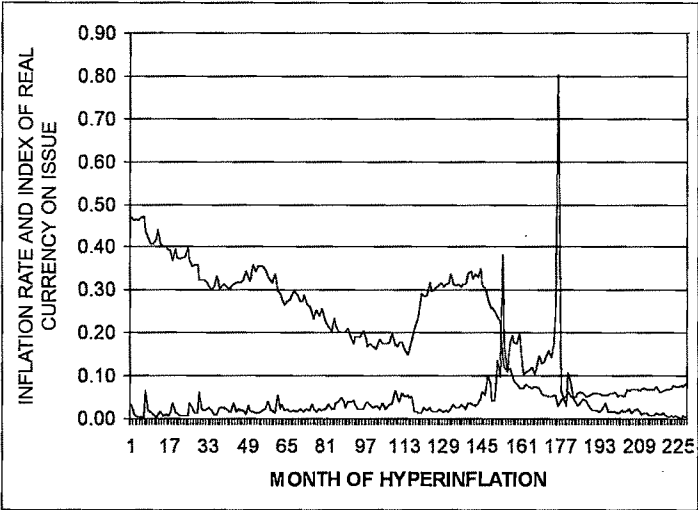
The data series that starts at just above 0.15 at month zero and then gradually declines is an index of the real currency on issue. The data series that begins at just above the origin at time zero and then gradually increases is the continuously compounded monthly rate of inflation divided by 5. The currency on issue series was extracted from line 34 of the International Monetary Fund's database, <http://www.imfstatistics.org/imf/>. The Consumer Price Index series was extracted from line 64 of the IMF's database.

Figure 2
Index of real currency on issue and monthly rate of inflation for Israeli economy from January 1974 (month 1) until December 1987 (month 168)



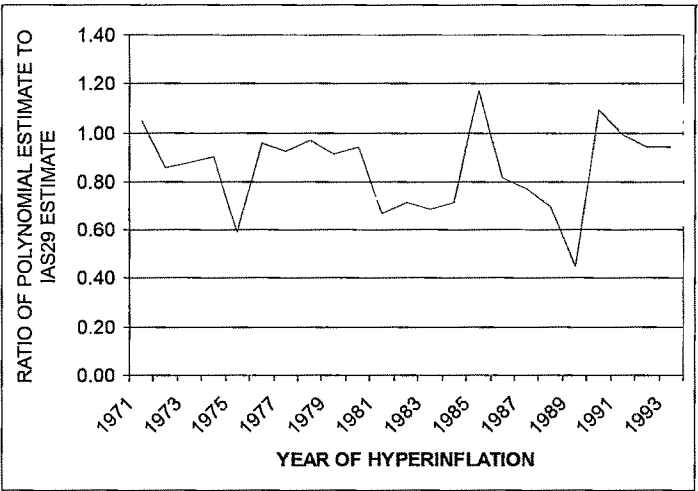
The data series that starts at just above 0.35 at month zero and then gradually declines is an index of the real currency on issue. The data series that begins at just below 0.05 at time zero and then gradually increases is the continuously compounded monthly rate of inflation. The currency on issue series was extracted from line 34 of the International Monetary Fund's database, <http://www.imfstatistics.org/imf/>. The Consumer Price Index series was extracted from line 64 of the IMF's database.

Figure 3
Index of real currency on issue and monthly rate of inflation for Peruvian economy from January 1976 (month 1) until December 1994 (month 228)



The data series that starts at just below 0.50 at month zero and then gradually declines is an index of the real currency on issue. The data series that begins just above the origin at time zero and then gradually increases is the continuously compounded monthly rate of inflation divided by two. The currency on issue series was extracted from line 34 of the International Monetary Fund's database, <http://www.imfstatistics.org/imf/>. The Consumer Price Index series was extracted from line 64 of the IMF's database.

Figure 4
Ratio of the average of four polynomial estimates to the IAS 29 estimate of the annual purchasing power loss on the Argentinean currency from 1971 to 1993



This graph depicts the ratio of two data series. The first is based on the four estimates of the purchasing power loss on the Argentinean currency using the polynomial formulae summarised in Table 1. For each year, the four estimates obtained from these formulae are averaged to give the first data series. The second data series estimates the purchasing power loss using the IAS 29 procedures. The graph summarises the ratio of the average polynomial estimate to the IAS 29 estimate of the purchasing power loss for each year of the Argentinean hyperinflation.

procedures are much smaller than is the case for the earlier hyper-inflations examined by Cagan (1956).¹¹ We have previously noted that the principal reason for this is that the hyperinflations examined by Cagan (1956) were characterised by rapidly increasing rates of inflation that reached a crescendo over a short period of time (typically one to two years or less) and then quickly petered out. Moreover, during this period of rapidly increasing inflation there is a precipitous decline in the real value of the currency on issue. The more recent IMF hyperinflations in contrast have tended to be of much longer duration (typically five to 20 years) and the real value of the currency on issue has tended to decline much more slowly for the IMF hyperinflations than is the case with the Cagan (1956) hyperinflations. This is illustrated by Figures 1, 2 and 3, which graph the time series of an index of the real currency on issue and the monthly rate of inflation for the Argentinean, Israeli and Peruvian hyperinflations, respectively. These graphs, which are typical of the 25 hyperinflations for which data are available from the IMF web site show that the rate of decline in the index of real currency on issue is quite modest when compared to the 'equivalent' data for the Hungarian hyperinflation of 1945 and 1946 examined by Cagan (1956), details of which are summarised in Table 5. This means that for the IMF hyperinflations the beginning of the year and end of year figures for the real value currency on issue (and their associated inflation rates) are much more likely to be 'representative' of their values over the entire year than will be the case for the Cagan (1956) hyperinflations. Hence, it is more likely that the IAS 29 procedures, which are based on just these two observations of the real value of the currency on issue (and their associated inflation rates), will provide more reliable estimates of the purchasing power losses from inflation than is the case when it is applied to the 'short, sharp' hyperinflations examined by Cagan (1956). Against this, it must be emphasised that even for the IMF hyperinflations summarised in Table 7 the IAS 29 procedures appear to return estimated purchasing power losses that typically, are 10% higher than those obtained from using the four polynomial approximation formulae summarised in Table 1.

However, even for the IMF hyperinflations there is a great deal of variation in the data. For the

Argentinean hyperinflation, the ratio of the average of the four polynomial estimates of the purchasing power loss to the purchasing power loss obtained from the IAS 29 procedures varies from 0.4469 in 1989 to 1.1744 in 1985. The complete time series of this ratio for the Argentinean hyperinflation is displayed in Figure 4. Likewise, for the Israeli hyperinflation this ratio varies from 0.7954 in 1984 to 1.0754 in 1986. Again, the complete time series of this ratio for the Israeli economy is displayed in Figure 5. Finally, for the Peruvian hyperinflation, the ratio of the average of the four polynomial estimates of the purchasing power loss to the purchasing power loss obtained from the IAS 29 procedures varies from 0.2592 in 1990 to 0.9962 in 1994. The complete time series of this ratio for the Peruvian economy is displayed in Figure 6. Hence, while the IAS 29 procedures return median estimates of the purchasing power loss that is approximately 10% higher than those obtained from the polynomial approximating formulae, the variation in the difference between the estimates is generally large. In other words, while there might be little difference in the estimates obtained from the polynomial approximating formulae and the IAS 29 procedures in any given year, in a contiguous year the polynomial based estimates can be less than half the estimate obtained from the IAS 29 procedures.

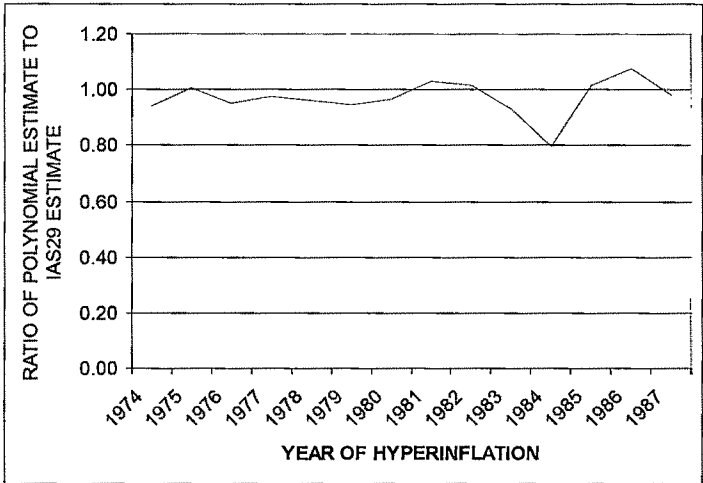
4. A general 'two-point' formula

The most obvious way of addressing this issue of the unreliability of simple estimation procedures (as summarised in IAS 29) is to employ more robust (sophisticated) estimating formulae. There are two possibilities here. First, one can sample an organisation's monetary position and the inflation rate more frequently than just the one or two observations needed to implement the IAS 29 procedures. For example, if an organisation had monthly observations of both its monetary position and the rate of inflation, then its purchasing power gains and losses could be more reliably estimated using the low order polynomial formulae summarised in Table 1. The principal difficulty here, however, is that organisations would have to prepare detailed financial statements more frequently than is normally the case and this will be a costly exercise that most organisations will want to avoid. Fortunately, there is a second alternative.

This second alternative makes more realistic assumptions about the way an organisation's monetary holdings vary over time. Here Cagan (1956:31) notes that 'the only cost of holding cash balances that seems to fluctuate widely enough to account for the drastic changes in real cash balances during hyperinflations is the rate of depreciation in the value of money ...' Given this, it is probably reasonable to assume that for the hyper-

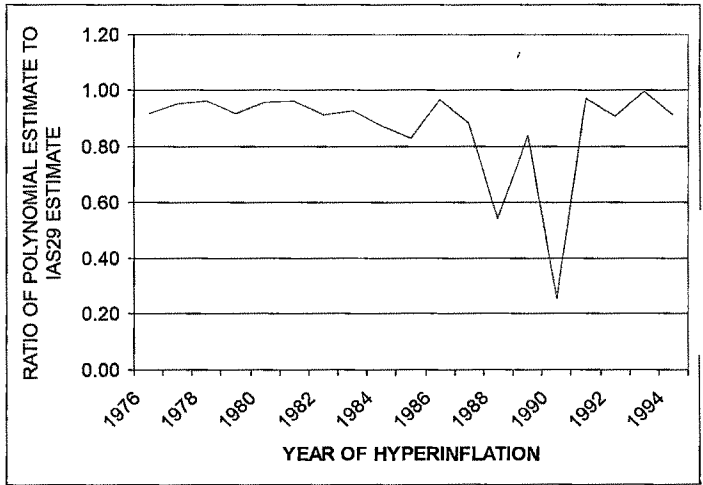
¹¹ Except for the Hungarian hyperinflation, which petered out in February 1924, Table 4 shows that the median ratios for the polynomial approximations to the estimates obtained from the IAS 29 procedures are all less than 0.75. While Table 7 shows that with one exception (Belarus) the equivalent ratios for the post-war hyperinflations are all less than unity, they are nonetheless much higher than the 0.75 recorded for the 'highest' median ratio for the Cagan (1956) hyperinflations.

Figure 5
Ratio of the average of four polynomial estimates to the IAS 29 estimate of the annual purchasing power loss on the Israeli currency from 1974 to 1987



This graph depicts the ratio of two data series. The first is based on the four estimates of the purchasing power loss on the Israeli currency using the polynomial formulae summarised in Table 1. For each year, the four estimates obtained from these formulae are averaged to give the first data series. The second data series estimates the purchasing power loss using the IAS 29 procedures. The graph summarises the ratio of the average polynomial estimate to the IAS 29 estimate of the purchasing power loss for each year of the Israeli hyperinflation.

Figure 6
Ratio of the average of four polynomial estimates to the IAS 29 estimate of the annual purchasing power loss on the Peruvian currency from 1976 to 1994



This graph depicts the ratio of two data series. The first is based on the four estimates of the purchasing power loss on the Peruvian currency using the polynomial formulae summarised in Table 1. For each year, the four estimates obtained from these formulae are averaged to give the first data series. The second data series estimates the purchasing power loss using the IAS 29 procedures. The graph summarises the ratio of the average polynomial estimate to the IAS 29 estimate of the purchasing power loss for each year of the Peruvian hyperinflation.

inflationary economies examined in our empirical work the single most important determinant of an organisation's investment in monetary items will be the persistent eating away of the purchasing power of the currency due to inflation. Now, as $P(t)$ is the price level at time t , it follows that $x(t) = \frac{1}{P(t)}$ represents the 'purchasing power' of the currency at this time. Moreover, one can define the variable, $z(t) = -\log[G(x(t))]$, as the logarithm of an arbitrary function, $G(x(t))$, of the purchasing power of the currency. Differentiating through $z(t)$ shows:

$$\frac{dz(t)}{dt} = -\frac{dz}{dG} \frac{dG}{dx} \frac{dx}{dP} \frac{dP}{dt} = \frac{G'(x)}{G(x)} \frac{P'(t)}{P^2(t)}$$

or equivalently:

$$P(1) \int_0^1 \frac{G'(x)}{G(x)} \frac{P'(t)}{P^2(t)} dt = -P(1) \cdot \log[G(x(t))]_0^1 =$$

$$P(1) \cdot \log \left\{ \frac{G\left(\frac{1}{P(0)}\right)}{G\left(\frac{1}{P(1)}\right)} \right\}$$

This result shows that if the nominal value of an organisation's investment in monetary items amounts to $m(x) = \frac{G'(x)}{G(x)}$ at time t , then the loss in purchasing power over the unit time period can be stated in terms of the logarithm of the function, $G(x)$. In principle, this means that one only requires the organisation's beginning and end of period investment in monetary items as well as the price index at these two points in order to determine the purchasing power losses which arise in any given period.

One can illustrate the application of this result by following the IAS 29 procedure for estimating purchasing power gains and losses which, it will be recalled, is based on the premise that an organisation's monetary position changes on just a few (typically, one or two) occasions over an annual reporting period. In between these changes, the organisation's monetary position is assumed to remain constant. Given this, suppose an organisation maintains a nominal £1 investment in monetary items over an entire reporting period. This in turn implies that $m(x) = \frac{G'(x)}{G(x)} = 1$ or that $\log[G(x)] = x$. It then follows from the above result that the loss in purchasing power must be:

$$P(1) \int_0^1 \frac{G'(x)}{G(x)} \frac{P'(t)}{P^2(t)} dt = -P(1)[x]_0^1 = \frac{P(1) - P(0)}{P(0)}$$

In other words, the loss in purchasing power from investing one pound in monetary items over the entire reporting period will, as one might have ex-

pected, be given by the rate of inflation over this period.¹²

We have previously noted, however, that during hyperinflationary periods it is most unlikely that organisations will adjust their monetary holdings on just the few occasions on which the IAS 29 procedures for estimating purchasing power losses are based. Rather, as the hyperinflation gains in intensity organisations will become ever more vigilant in pruning their monetary holdings to the minimum compatible with maintaining their ongoing activities. Given this, we now assume that an organisation responds to the deteriorating hyperinflationary environment in which it has to operate by gradually reducing the real value of its monetary holdings. Thus, suppose that the real value of an organisation's investment in monetary items evolves in terms of the hyperbolic relationship $\frac{m(t)}{P(t)} = \frac{a}{P(t)} + b$ where a and b are parameters. Note that as the hyperinflation gains in intensity and the price level, $P(t)$, rises, this assumption implies that the real value of the organisation's investment in monetary items asymptotically declines towards the minimum, b , compatible with maintaining its ongoing activities. This also means that $\frac{G'(x)}{G(x)} = a + \frac{b}{x}$ or $\log[G(x)] = ax + b \log(x)$ and so, the loss in purchasing power on the organisation's monetary holdings will be:

$$P(1) \int_0^1 \frac{G'(x)}{G(x)} \frac{P'(t)}{P^2(t)} dt = -P(1)[ax + b \log(x)]_0^1 =$$

$$a \cdot \frac{P(1) - P(0)}{P(0)} + b \cdot P(1) \cdot \log \left[\frac{P(1)}{P(0)} \right]$$

¹² One could also implement this procedure by taking the alternative approach of assuming that real monetary holdings are inversely related to the instantaneous rate of inflation (Cagan, 1956: 33–35, Lucas, 2000: 250–251). It is not hard to show, however, that this alternative procedure is compatible with the approach taken in the text. Recall that under the interpretation of the "two-point" formula taken in the text real monetary holdings are assumed to be of the form

$$\frac{m(t)}{P(t)} = \frac{1}{P(t)}$$

that is, $m(t)$ is normalised to unity for illustrative purposes. This means that if one follows Cagan (1956:33–35) in assuming that the logarithm of real monetary holdings must also be inversely proportional to the rate of inflation or,

$$\log \left[\frac{1}{P(t)} \right] = -\alpha \frac{1}{P(t)} \cdot \frac{dP(t)}{dt}$$

where $\alpha > 0$ is the constant of proportionality, that the index of prices will have to satisfy the differential equation

$$\log[P(t)] = \alpha \cdot \frac{1}{P(t)} \cdot \frac{dP(t)}{dt}$$

Solving this differential equation shows that the two approaches are compatible when the price index evolves in accordance with the equation $P(t) = P(0) \exp[e^{\alpha-1}t]$.

This 'hyperbolic' formula requires as inputs the opening and closing values of the price index, $P(t)$, and the parameters a and b that describe the way in which the organisation's real monetary holdings change in response to the declining purchasing power of the currency. Hence, provided the parameters a and b are known (or can be reliably estimated), then all that is required to implement this formula is the opening and closing values of the price index, $P(t)$.¹³

One can illustrate the application of this hyperbolic formula by applying it to the data of the 25 hyperinflationary economies for which data are available from the IMF website. For each year of the hyperinflation in a given country the parameters a and b were estimated using the OLS regression procedure. Thus, for the Argentinean hyperinflation a and b were estimated in the first instance by using the 12 monthly observations of $m(t)$ and $P(t)$ for the year ending 31 December 1971. These estimates of a and b were then used in

¹³ Again, one could implement the interpretation of the 'two-point' formula taken here by assuming that real monetary holdings are inversely related to the instantaneous rate of inflation. To provide a second example of the procedures involved, however, we now follow Lucas (2000:250–251) in assuming that real monetary holdings are inversely proportional to the square root of the rate of inflation or,

$$\frac{m(t)}{m(t)} = \alpha \sqrt{\frac{1}{P(t)} \frac{dP(t)}{dt}}$$

where $\alpha > 0$ is the constant of proportionality. Now, since the hyperbolic interpretation of the "two-point" formula given in the text assumes that real monetary holdings evolve in accordance with the formula

$$\frac{m(t)}{P(t)} = \frac{a}{P(t)} + b$$

it follows that the price index will have to satisfy the differential equation

$$\alpha \sqrt{\frac{1}{P(t)} \frac{dP(t)}{dt}} = \frac{P(t)}{a + bP(t)}$$

Solving this differential equation shows that the two approaches are compatible when the price index evolves in accordance with the equation

$$\frac{P(t)}{P(0)} \frac{\exp\left[\frac{1}{2} \left\{ \frac{a + 2bP(0)}{bP(0)} \right\}^2 t\right]}{\exp\left[\frac{1}{2} \left\{ \frac{a + 2bP(t)}{bP(t)} \right\}^2 t\right]} = \exp\left(\frac{t}{b^2 \alpha^2}\right).$$

¹⁴ Since we have previously argued that purchasing power losses computed from the polynomial-based formulae are more reliable than those obtained under the procedures endorsed in IAS 29, it follows that estimates obtained from the polynomial formulae are the appropriate benchmark to use here.

¹⁵ Turkey is unique in that we were unable to find an intertemporally consistent functional relationship between the real value of the currency on issue and the purchasing power of the Turkish lira. While there are functional forms that provide a satisfactory fit between these two variables over various subperiods, it appears that no one functional form provides a satisfactory fit over the entire period on which our analysis is based. This has the important implication that a simple 'two-point' formula for estimating the purchasing power losses on the currency may not exist for Turkey.

conjunction with the (opening) price index on 31 December 1970 and (closing) price index on 31 December 1971 to estimate the purchasing power loss on the currency using the hyperbolic formula. This procedure was also replicated for each of the 23 years for which the Argentinean hyperinflation lasted. For each year of the hyperinflation, we then computed the ratio of the estimated purchasing power loss under the hyperbolic formula to the average of the four estimates obtained from using the polynomial-based formulae summarised in Table 1.¹⁴ The results of this exercise, summarised in Table 8a, show that the median ratio across the 23 observations available for the Argentinean hyperinflation is 1.0075. Moreover, the maximum of these 23 ratios is 1.0696 and occurs in 1990 while the minimum ratio of 0.7914 occurs in 1988. The summary information reported in Tables 8a and 8b for the other 24 hyperinflationary economies for which data are available from the IMF website are to be interpreted in the same way as those for the Argentinean hyperinflation.

The results summarised in Table 8a and Table 8b show that for most countries in our sample the hyperbolic formula returns estimated purchasing power losses that are very close to those obtained from the polynomial formulae. With the exception of Turkey, the median estimates of the purchasing power losses under the hyperbolic formula are all within 2.5% of the median estimates obtained from the polynomial-based formulae. Furthermore, there is substantial consistency across the estimates with most of the ratios summarised in Table 8 closely packed around unity. Thus, these results show that if realistic assumptions can be made about the way monetary items vary in response to changes in the purchasing power of the currency, then over any given period it is possible to make reliable estimates of the purchasing power losses that arise on the currency with as few as two observations.

The importance of making realistic assumptions about the way monetary holdings respond to variations in the purchasing power of the currency is highlighted by the Turkish hyperinflation. For Turkey, the median ratio of the estimated loss under the hyperbolic formula to the average of the estimated losses under the polynomial formulae is 1.0906. This means that the hyperbolic formula returns estimated purchasing power losses that typically, are around 9% larger than the estimates obtained from the polynomial-based formulae. In other words, for Turkey the assumption of hyperbolic variations in the real currency on issue returns significantly different estimates of purchasing power losses when compared to those obtained under the polynomial formulae and as such, do not represent a realistic model of how monetary holdings adjust in response to variations in the purchasing power of the currency on issue.¹⁵

Table 8a

Ratio of the estimated loss on the currency under the 'hyperbolic' formula to the average estimated loss from the four polynomial-based formulae, by country and period of hyperinflation for hyperinflationary economies with data available on the international monetary fund (IMF) website: <http://www.imfstatistics.org/imf/>

Country/year	ANGOL	ARGEN	BELAR	BOLIV	BRAZI	CHILE	CONG	DOMIN	ECUA	ESTON	ISRAE	JAMAI	MADA
1968						1.0116							
1969						1.0100							
1970						1.0093							
1971		0.9922				1.0048							
1972		0.9770				1.0493							
1973		1.0252				1.0017							
1974		0.9749				0.9982					1.0026		
1975		1.0237				0.9908					0.9997		
1976		1.0447				0.9958	1.0000				1.0036		
1977		1.0031					0.9985				0.9970		
1978		1.0081					0.9942				1.0055		
1979		1.0028		0.9963			1.0160				1.0005		
1980		1.0063		1.0032	1.0105		1.0056				0.9982		
1981		1.0478		0.9842	1.0152		0.9962				0.9925		
1982		0.9820		1.0028	1.0081		0.9815				0.9961		
1983		1.0069		1.0064	1.0058		0.9307				0.9935		
1984		1.0019		0.9558	1.0091		0.5242		1.0049		1.0081		
1985		1.0356		0.5433	1.0067		0.9946		0.9961		1.0239		
1986		1.0130		0.9873	1.0683		1.0086		1.0297		0.9726		
1987		1.0256		1.0038	1.0188		1.0149		1.0141		0.9985		
1988		1.0270		1.0217	0.9878		1.0005		1.0126				
1989		0.7914			0.9856		0.9858	1.0079	1.0038				
1990		0.8526			1.3373		0.9809	0.9994	1.0095				
1991		1.0696			1.0397		1.0373	1.0218	1.0144			1.0069	
1992		1.0075			0.9715		1.0251		1.0239	1.0033		1.0128	
1993		1.0216			0.9409		1.0296		1.0113	0.9978		0.9982	
1994					0.8862		1.2761		1.0199	1.0041		1.0143	0.9750
1995			0.9972		1.0347		0.9953		1.0049				1.0015
1996		0.9145	1.0037		1.0174				1.0134				0.9749
1997		0.8997	0.9986						1.0041				
1998		1.0498	0.9646						1.0275				
1999		1.0255	1.0126						1.0724				
2000		1.0014	0.9971						1.0090				

Table 8a
Ratio of the estimated loss on the currency under the 'hyperbolic' formula to the average estimated loss from the four polynomial-based formulae, by country and period of hyperinflation for hyperinflationary economies with data available on the international monetary fund (IMF)
website: <http://www.imfstatistics.org/imf/> (continued)

Country/year	ANGOL	ARGEN	BELAR	BOLIV	BRAZI	CHILE	CONG	DOMIN	ECUA	ESTON	ISRAEL	JAMAI	MADA
2001			1.0187						0.9987				
2002	0.9782		1.0079						1.0003				
2003	1.0134												
2004	1.0295		1.0047										
2005	1.0246												
	1.0116												
MEDIAN	1.0125	1.0075	1.0037	0.9995	1.0091	1.0048	0.9993	1.0079	1.0113	1.0033	0.9991	1.0099	0.9750
MAXIMUM	1.0498	1.0696	1.0187	1.0217	1.3373	1.0493	1.2761	1.0218	1.0724	1.0041	1.0239	1.0143	1.0015
MINIMUM	0.8997	0.7914	0.9646	0.5433	0.8862	0.9908	0.5242	0.9994	0.9961	0.9978	0.9726	0.9982	0.9749

Each entry in the table is the ratio of two estimates of the purchasing power loss on the currency for the given year. The first estimate is obtained by averaging the estimates obtained from the four polynomial formulae summarised in Table 1. The second estimate is obtained by using the two-point hyperbolic formula with parameters, a and b. The table summarises the ratio of the hyperbolic estimate to the average polynomial estimate of the purchasing power loss for each year of the hyperinflation for the given country.

Table 8b
Ratio of the estimated loss on the currency under the 'hyperbolic' formula to the average estimated loss from the four polynomial-based formulae, by country and period of hyperinflation for hyperinflationary economies with data available on the International Monetary Fund (IMF)
website: <http://www.imfstatistics.org/imf/>

Country/year	MEXIC	NICAR	PERU	POLA	ROMA	RUSSI	SURI	TURK	UKRAI	URUG	ENEZ	ZIMBA
1968												
1969												
1970												
1971												
1972												
1973												
1974												
1975												
1976												
1977			0.9998					1.0393		0.9963		
1978			1.0074					1.0055		1.0052		
1979			1.0067					1.1045		1.0055		
1980			1.0082					1.0829		0.9990		
1981			1.0029					1.0655		1.0180		
1982			1.0001					1.1653		1.0095		
1983			1.0063					1.1838		0.9667		
1984			1.0094					1.1171		1.0010		
1985			1.0045					1.0875		1.0165		
1986			1.0365					1.1172		1.0122		
1987			1.0011					1.3663		1.0099		
1988	1.0096	1.6907	1.0030					1.1228		1.0167	0.9929	
1989	1.0027	0.9049	0.9814					1.0678		1.0103	1.0004	
1990	1.0046	0.8443	0.9826					1.0812		1.0104	1.0066	
1991	0.9967	1.0993	0.7674	0.9048				1.1237		1.0210	1.0097	
1992	0.9946	1.0143	1.0064	0.9987				1.0870		1.0210	1.0092	
1993		1.0103	1.0103	1.0000			0.9980	1.0866		1.0092	1.0030	
1994			1.0019	1.0015	1.0271		1.0014	1.1235	1.5072	1.0091	1.0154	
1995			1.0167	1.0063	1.0042		1.0122	1.0810	0.9673	1.0156	1.0095	
1996				1.0066	1.0038		1.1816	1.0721	1.0317	1.0121	1.0027	
1997					1.0288		0.9744	1.1095	1.0146	1.0173	1.0217	
1998					1.0217	1.0459	0.9958	1.0906	1.0091		1.0109	0.9824
1999					1.0268	1.0051	1.0178	1.1654			1.0094	1.0184
2000					1.0140	1.0033	0.9447	1.1029				1.0106

Table 8b
Ratio of the estimated loss on the currency under the ‘hyperbolic’ formula to the average estimated loss from the four polynomial-based formulae, by country and period of hyperinflation for hyperinflationary economies with data available on the International Monetary Fund (IMF)
website: <http://www.imfstatistics.org/imfi/> (continued)

Country/year	MEXIC	NICAR	PERU	POLA	ROMA	RUSSI	SURI	TURK	UKRAI	URUG	ENEZ	ZIMBA
2001					1.0187		1.0770	1.0947				0.9970
2002					1.0181		0.9898	1.0790				
2003								1.0440				
2004												
2005												
MEDIAN	1.0027	1.0123	1.0045	1.0008	1.0187	1.0051	1.0014	1.0906	1.0146	1.0103	1.0093	1.0038
MAXIMUM	1.0096	1.6907	1.0365	1.0066	1.0288	1.0459	1.4509	1.3663	1.5072	1.0210	1.0217	1.0184
MINIMUM	0.9946	0.8443	0.7674	0.9048	1.0038	1.0033	0.9447	1.0055	0.9673	0.9667	0.9929	0.9824

Each entry in the table is the ratio of two estimates of the purchasing power loss on the currency for the given year. The first estimate is obtained by averaging the estimates obtained from the four polynomial formulae summarised in Table 1. The second estimate is obtained by using the two-point hyperbolic formula with parameters, a and b. This table summarises the ratio of the hyperbolic estimate to the average polynomial estimate of the purchasing power loss for each year of the hyperinflation for the given country.

It must also be emphasised that there are important implementation issues with respect to the two-point estimation formulae derived and illustrated in this section. Foremost among these is that the two-point estimation formulae normally include parameters that must either be known or can be estimated with minimal error. The hyperbolic formula, for example, hinges on two parameters, a and b , that capture the way in which an organisation's real monetary holdings respond to variations in the purchasing power of the currency. In our empirical analysis, we estimated these parameters over successive annual periods using monthly observations and the OLS regression procedure. In the "real world", however, an efficient organisation's monetary assets and liabilities will be constantly managed in order to minimise the purchasing power losses that arise from them and so one would expect that these parameters (a and b) will either be readily available or can be determined with little difficulty.¹⁶

5. Summary and conclusions

The International Accounting Standards Board (IASB) has endorsed financial reporting standard IAS 29: *Financial Reporting in Hyperinflationary Economies* to address the unique financial reporting problems that arise in hyperinflationary environments. Para. 9 of IAS 29 requires that the net gain or loss in purchasing power from holding monetary assets and liabilities must be disclosed on an organisation's profit and loss statement. IAS 29 endorses an estimation procedure based on the simple assumption that an organisation's monetary position changes on just a few (typically, one or two) occasions over an annual reporting period and that in between these changes its monetary position remains constant. In contrast, we treat the problem of estimating purchasing power gains and losses that arise on an organisation's monetary holdings as an exercise in numerical analysis. Under this regime, purchasing power gains and losses are estimated by fitting interpolating polynomials to an organisation's monetary holdings and the price index from which the inflation rate is computed. We develop four estimation formulae

based on this methodology and then use them to estimate the purchasing power losses that have arisen on the national currencies of 32 hyperinflationary economies covering an exhaustive set of hyperinflationary environments and spanning a period in excess of 80 years. Our analysis shows that the estimation procedures summarised in IAS 29 perform poorly in comparison to the more reliable polynomial estimation formulae, especially when the inflation rate accelerates towards the end of a relatively short hyperinflationary period.

There are, however, some distinct advantages with the estimation procedures summarised in the IAS 29 standard. The most obvious of these is that the IAS 29 estimation procedures can be implemented with just a few (typically, one or two) observations of an organisation's monetary holdings and the price index from which the rate of inflation is computed. Against this, the polynomial estimation formulae require monthly observations of the monetary holdings and price index data in order to estimate the purchasing power gains and losses that arise over an annual time period. We show, however, that if one makes 'realistic' assumptions about the way an organisation's monetary holdings respond to variations in the purchasing power of the currency, then one can derive a general class of two-point estimation formulae that use only the sparse information set on which the IAS 29 estimation procedures are based. Moreover, our empirical analysis shows that these two-point formulae return estimated purchasing power gains and losses that are similar to those obtained from the more informationally demanding polynomial interpolation techniques.

Our analysis also has important implications for the 'quality' of reported earnings during hyperinflationary periods. An organisation's earnings are regarded as having higher quality when larger sales and/or lower costs make a more significant contribution towards earnings increases than 'artificially' created profits such as those arising from inflation (Hodge, 2003: 41–43, Schipper and Vincent, 2003: 99–106). In particular, the uncertainty created by the measurement problems that arise during periods of hyperinflation mean that the quality of reported earnings is lower during hyperinflationary periods than will be the case during periods of stable prices. By providing a mechanism through which one of the more difficult measurement problems that arise in hyperinflationary environments can be resolved, our analysis makes an important contribution towards improving the quality of the earnings reported by organisations that have to operate in a hyperinflationary environment.

¹⁶ Lucas (2000: 247) notes that 'it is in everyone's private interest to try to get someone else to hold non-interest-bearing cash and reserves. But someone has to hold it all All of us spend several hours per year in this effort, and we employ thousands of talented and highly trained people to help us. These person-hours are simply thrown away, wasted on a task that should not have to be performed at all.'

Appendix

Derivation of quadrature formulae

Let $f(t) = \frac{m(t)}{P(t)}$ be the real monetary holding and $g(t) = \log[P(t)]$ be the logarithm of the price index, both at time t . Now, suppose one approximates $f(t)$ and $g(t)$ as second degree (quadratic) interpolating polynomials. One can then follow the procedures laid down in Carnahan, Luther and Wilks (1969: 72-73) to show that the loss in purchasing power over the unit time period will then be approximated as:

$$\int_0^1 f(t)dg(t) \approx \int_0^2 [f(0) + \alpha \Delta f(0) + \frac{\alpha(\alpha-1)}{2!} \Delta^2 f(0)] [\Delta g(0) + \frac{2\alpha-1}{2!} \Delta^2 g(0)] d\alpha$$

where $\Delta f(0) = f(\frac{1}{2}) - f(0)$ and $\Delta^2 f(0) = f(1) - 2f(\frac{1}{2}) + f(0)$ are the first and second differences in the real monetary holdings and $\Delta g(0) = g(\frac{1}{2}) - g(0)$ and $\Delta^2 g(0) = g(1) - 2g(\frac{1}{2}) + g(0)$ are the first and second differences in the logarithm of the price index. Evaluating the above integral shows:

$$\int_0^1 f(t)dg(t) \approx 2f(0)\Delta g(0) + 2\Delta f(0)\Delta g(0) + f(0)\Delta^2 g(0) + \frac{5}{3}\Delta f(0)\Delta^2 g(0) + \frac{1}{3}\Delta g(0)\Delta^2 f(0) + \frac{1}{2}\Delta^2 f(0)\Delta^2 g(0)$$

Simplifying the above expression by substituting the first and second differences for $f(\cdot)$ and $g(\cdot)$ shows:

$$\int_0^1 f(t)dg(t) \approx \left[\frac{1}{2} \frac{m(0)}{P(0)} + \frac{2}{3} \frac{m(\frac{1}{2})}{P(\frac{1}{2})} - \frac{1}{6} \frac{m(1)}{P(1)} \right] \log \left[\frac{P(\frac{1}{2})}{P(0)} \right] + \left[\frac{1}{2} \frac{m(1)}{P(1)} + \frac{2}{3} \frac{m(\frac{1}{2})}{P(\frac{1}{2})} - \frac{1}{6} \frac{m(0)}{P(0)} \right] \log \left[\frac{P(1)}{P(\frac{1}{2})} \right]$$

Now, suppose one applies this formula on a bi-monthly basis over the fiscal year, beginning with the months January and February. It then follows that $\frac{m(0)}{P(0)}$ will be the real monetary position on 1 January, $\frac{m(\frac{1}{2})}{P(\frac{1}{2})}$ will be the real monetary position on 31 January and $\frac{m(1)}{P(1)}$ will be the real monetary position on 28 February. Likewise, $\log[P(0)]$ will be the logarithm of the price index on 1 January, $\log[P(\frac{1}{2})]$ will be the logarithm of the price index on 31 January and $\log[P(1)]$ will be the logarithm of the price index on 28 February. Moreover, this means that the second degree interpolation formula for

$$\int_0^1 f(t)dg(t)$$

given above, will be the estimated purchasing power loss for the months of January and February. One can apply this formula again to determine the estimated purchasing power loss for the months of March and April and then again to determine the estimated purchasing power loss for the months of May and June and so on for each bi-monthly period over the entire year. When one adds the six bi-monthly estimates of the purchasing power losses together then one will have the purchasing power loss for the entire year as determined by the following formula:

$$P(1) \sum_{j=1}^6 \int_{\frac{j-1}{6}}^{\frac{j}{6}} \frac{m(t)}{P(t)} d\log[P(t)] \approx \frac{P(1)}{6} \sum_{j=1}^6 \left\{ \left[-\frac{3m(\frac{2j-2}{12})}{P(\frac{2j-2}{12})} + \frac{4m(\frac{2j-1}{12})}{P(\frac{2j-1}{12})} - \frac{m(\frac{2j}{12})}{P(\frac{2j}{12})} \right] \cdot \log \left[\frac{P(\frac{2j-1}{12})}{P(\frac{2j-2}{12})} \right] + \left[-\frac{m(\frac{2j-2}{12})}{P(\frac{2j-2}{12})} + \frac{4m(\frac{2j-1}{12})}{P(\frac{2j-1}{12})} - \frac{3m(\frac{2j}{12})}{P(\frac{2j}{12})} \right] \cdot \log \left[\frac{P(\frac{2j}{12})}{P(\frac{2j-1}{12})} \right] \right\}$$

Here we have multiplied the expression

$$\int_0^1 \frac{m(t)}{P(t)} d\log[P(t)] = \sum_{j=1}^6 \int_{\frac{j-1}{6}}^{\frac{j}{6}} \frac{m(t)}{P(t)} d\log[P(t)]$$

by $P(1)$, the value of the price index on 31 December, in order to state the purchasing power loss at the price level prevailing at the end of the relevant year. The estimation formulae for first, third and fourth-degree interpolation are derived in similar fashion to the formula given here for second-degree interpolation.

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Earnings management and the distribution of earnings relative to targets: UK evidence

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Abstract—In this paper we provide new evidence on discontinuities in the distribution of reported earnings, using a large sample of UK firms. We examine the discontinuity phenomenon in the context of earnings management. We report that the empirical distribution of earnings before discretionary working capital accruals does not reflect the unusually high frequencies of small surpluses and unusually low frequencies of small deficits relative to targets found in the distribution of actual (reported) earnings, i.e. after discretionary working capital accruals. We find that discretionary working capital accruals have the effect of significantly increasing the frequencies of firms achieving earnings targets both overall and by small margins. Thus, we document an explicit link between working capital accruals-based earnings management and the discontinuities observed in the empirical distribution of earnings relative to targets. We also examine earnings management before and after the issuance of FRS 3 'Reporting Financial Performance' and find evidence that FRS 3 altered earnings management strategies adopted by companies.

Key words: Accounting manipulation, discretionary accruals, earnings management.

Data availability: Data are available from the public or commercial sources identified in the paper.

1. Introduction

The corporate scandals of the late 1990s and early 2000s seriously undermined public confidence in financial reporting and hence in financial markets. Suspicions that reported earnings numbers cannot be relied upon, and that they are managed, are widespread. Academic interest in this area began before the *causes célèbre* occurred and has since grown, focusing on investigations into why and how earnings management is conducted. One particular line of research centres on the finding that the empirical distribution of earnings relative to basic targets displays discontinuities at zero. In particular, evidence that small negative earnings levels, changes and surprises occur with unexpectedly low frequency and small positive earnings levels, changes and non-negative surprises occur with unexpectedly high frequency (Hayn, 1995; Burgstahler and Dichev, 1997; Degeorge et al.,

1999; Burgstahler and Eames, 2003, 2006). One potential explanation of this behaviour is earnings management to beat benchmarks, e.g. to avoid losses. Consistent with this explanation, Burgstahler and Dichev (1997) find that both operating cash flow and working capital accruals (WCA) rise sharply when reported earnings is just above zero.

Evidence on benchmark beating earnings has been used extensively in subsequent earnings management research (see, for example, Payne and Robb, 2000; Beaver et al., 2003, 2004; Dichev and Skinner, 2002; Beatty et al., 2002; Leuz et al., 2003; Leone and Van Horn, 2005; Phillips et al., 2003; Frank and Rego, 2004; Roychowdhury, 2006). However, recent research has raised doubts about whether earnings management does indeed explain the observed discontinuities in the distribution of earnings (e.g. Dechow et al., 2003; Degeorge et al., 1999; Durtschi and Easton, 2005). In this paper we contribute to this literature in two main ways. First, we analyse an extensive non-US dataset for the first time in the literature, thereby confirming that the discontinuities previously reported in the literature are not specific to the US setting. Second, we introduce new tests lending support to the hypothesis that the discontinuities in earnings distributions are associated with accruals-based earnings management in our sample.

Using a variety of tests, Dechow et al. (2003) are unable to find systematic evidence of accruals management connected to discontinuities in earnings distributions for their US sample. When they compare small profit firm-years with all others, they find that the former have higher average discretionary accruals (DACC), cash flows and total

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accruals than the latter. However, when they compare small profit firm-years with small loss firm-years, they find insignificant differences between the two groups. Dechow et al. (2003) also compare zero earnings surprise firm-years with all others and with small negative surprise firm-years. They find that zero surprise firm-years have higher DACC and WCA than all other firm-years and higher WCA than small negative surprise firm-years. However, Dechow et al. (2003) find that the difference between average DACC for zero and small negative surprise firm-years is statistically insignificant. They conclude that earnings management to achieve targets via real (operating) decisions is a more likely explanation for the discontinuities.

Degeorge et al. (1999) suggest that the distributional irregularities could be a manifestation of scaling earnings. Durtschi and Easton (DE) (2005) also suggest that scaling is important in understanding the discontinuities in the distribution of inflated earnings per share. DE argue that use of beginning of year stock price to deflate earnings per share can induce discontinuities for two reasons. First stock price depends on earnings – the stock prices for firms with small losses are systematically lower than stock prices for small profits. Second, loss firms are more likely to have missing values for beginning of year stock prices in their data, resulting in potential selection bias. DE argue that both these effects can lead to ‘spurious’ discontinuities in the distribution of scaled earnings that are unconnected to earnings management. Beaver et al. (2004) suggest that the asymmetric treatment of profits and losses and the recognition of special items together might account for up to two thirds of the discontinuity. However, they do not rule out the possibility of other factors being important, including abnormal accruals (p.34). In contrast, Jacob and Jorgensen (2005) show that fourth-quarter earnings are considerably more volatile. While annual earnings measured over the fiscal year display the expected discontinuities, these discontinuities are not evident in different annual periods ending in quarters one, two or three of the fiscal year. Overall, Jacob and Jorgensen (2005) conclude that their results are consistent with manipulation of fiscal year earnings.

In summary, there is no clear consensus in the recent literature as to whether discontinuities in earnings distributions reflect earnings management or are research design biases. In this paper we undertake a detailed examination of earnings management around earnings thresholds, using a large sample of UK firms. We focus on earnings management involving manipulation of working capital accruals. In contrast to Dechow et al. (2003) we present evidence consistent with earnings management to achieve targets. In particular we show that adjustment of earnings for discretionary accruals eliminates the discontinuity around earnings targets.

Accounting manipulation of working capital accruals (WCA) suggests itself as a potentially popular technique for achieving earnings targets. Healy (1985:103) points out that accrual manipulation is less costly and more feasible on a multi-period basis than accounting method changes as a means of transferring earnings between periods. Further, DeFond and Jambalvo (1994: 158) view WCA as more susceptible to manipulation than non-working capital accruals. In this study, we investigate the links between the discretionary component (termed discretionary accruals, hereafter DACC) of WCA, the frequency of earnings target achievement and the observed discontinuity in the distribution of earnings relative to basic targets.¹ The targets we consider are the achievement of positive earnings levels and changes and the avoidance of negative earnings surprises. Our primary objective is to determine whether DACC, a frequently used proxy for earnings management, contribute significantly to the unexpectedly high frequencies of positive, particularly small positive, earnings levels, changes and surprises.² We also wish to obtain an insight into the overall impact of DACC on the distribution of earnings relative to targets, and hence to provide evidence on whether manipulation of the accruals process is an important earnings management tool.

Our paper is novel because it provides specific evidence on the manner in which firms use DACC with reference to basic earnings targets. Prior studies have typically used DACC as a proxy for earnings management without specifying the manner in which firms use DACC to manage earnings. For example, Becker et al. (1998) and Francis et al. (1999), although both hypothesising that Big 5 (then Big 6) auditors constrain earnings management more effectively than non-Big 5 auditors, interpret this prediction differently. Becker et al. (1998) imply that *signed* DACC are negatively associated with the presence of Big 5 auditors while Francis et al. (1999) imply that it is *absolute* DACC that are negatively associated with the presence of Big 5 auditors. This reflects different underlying assumptions about the manner in

¹ We define DACC as the discretionary component of total working capital accruals. DACC are also defined, elsewhere in the literature, as the discretionary component of total accruals including long-term accruals such as depreciation. We use the expression DACC in referring to other studies that use that expression even if they define it differently from us. In Section 3, we explain our definition of DACC and the estimation technique we use.

² See footnote 6 for a detailed explanation of our usage of positive and negative.

which firms use DACC to manage earnings.³

A further contribution of the paper is to provide evidence on whether the phenomenon of discontinuities in the distribution of earnings extends beyond the US corporate environment and GAAP regime. In recent years, there has been heightened interest in the impact of different economic environments and GAAP regimes on the attributes of accounting earnings (Pope and Walker 1999; Ali and Hwang 2000; Ball et al. 2000), and on the incidence of earnings and forecast management (Brown and Higgins 2001). In addition, Leuz et al. (2003) provide evidence of a correlation between loss avoidance and accruals-based measures of earnings management. This paper extends and deepens this growing international accounting literature by reporting detailed evidence of the links between earnings discontinuities and accruals manipulation based on a large sample of UK firms.

The UK context is interesting for a number of reasons. Firstly, the incentives for earnings management differ from those in the US (the basis of most research to date). Ball et al. (2000: 25–29) point out that the UK has the least regulated and least litigious accounting environment among the common-law countries they study, and that corporate debt is primarily private in the UK. According to Ball et al. (2000), these factors imply a reduced demand for timely incorporation of bad news into accounting earnings reported by UK firms. Such lower demand for timely reporting of bad news allows managers greater flexibility compared to the US to manage earnings through timing of recognition. In seeming contrast, Brown and Higgins (2001) cite evidence that UK managers have vastly smaller holdings of stock options than their U.S. counterparts, and thus suggest that UK managers have less incentive to manipulate earnings to avoid reporting bad news than US managers. However, in their 2005 paper, Brown and Higgins suggest that the impact of differences in expectations management behaviour between countries may partially explain the apparent differences in incentives for earnings management.⁴

Another UK-specific feature is the regime change that occurred regarding the reporting of extraordinary items. Prior to the issuances of FRS 3 (Accounting Standards Board, 1992), the majority of extraordinary debits concerned restructurings of

businesses, i.e. seemingly not extraordinary in nature, whereas many apparently extraordinary credits were treated as merely 'exceptional' and taken as 'above the line' income. One of the reasons given for the issuance of FRS 3 was thus to eliminate the use of extraordinary items as a means of earnings management. We are thus able to examine the use of extraordinary items as an earnings management tool, both pre- and post-FRS 3.

Our results indicate that the earnings levels, changes and surprises of UK firms, like those of US firms, are distributed discontinuously around zero. Specifically, we observe unusually low incidence of small negative earnings levels, changes and surprises, and unusually high incidence of small positive earnings levels, changes and surprises. However, non-discretionary earnings levels, changes and surprises for the same sample are distributed without this discontinuity at zero, suggesting that the discontinuity in the earnings distribution is attributable to DACC.⁵ We further document that DACC have the effect of significantly increasing the incidence of small positive earnings levels, changes and surprises. DACC also have the effect of reducing the incidence of both positive and negative earnings levels, changes and surprises of large magnitude.

Further, we report evidence that exact zero earnings surprises are associated with unusual variance in DACC, suggesting idiosyncratic use of DACC to meet forecasts exactly. We also find that exact zero earnings surprises are associated with relatively low average extraordinary items, high incidence of negative extraordinary items, and low incidence of positive extraordinary items. This result is consistent with exact zero earnings surprises being achieved with the aid of misclassification of extraordinary items.

The main contributions of this paper can be summarised as follows. Firstly, we provide a previously undocumented general empirical explanation of the discontinuity observed at zero in the distribution of earnings relative to targets. Specifically, we report that accounting manipulation by the generality of (non-financial) companies through DACC is a significant contributor to this discontinuity. Secondly, we quantify the extent to which firms achieve earnings targets with the aid of DACC. The paper thus also contributes further to the methodological debate by providing support for the use of DACC as a proxy for earnings management. However, this evidence also indicates that the extent to which, and direction in which, firms use DACC to manage earnings varies with the relationship between earnings before DACC and basic earnings targets. This has implications for the interpretation of previous studies, and design of future studies, using DACC to proxy for earnings management. The evidence we report also

³ Alternatively, or additionally, it implies different assumptions on the loss function of auditors.

⁴ The literature of which this latter paper forms a part examines the manipulation by company management of analyst expectations, i.e. seeking to guide downwards expectations, rather than having to (or in addition to) managing earnings upwards.

⁵ We use the term non-discretionary earnings to mean earnings before DACC, or unmanaged earnings ignoring earnings management effected other than through DACC.

contributes to the literature examining the circumstances under which firms seek to manage earnings (e.g., Nelson et al. 2003).

2. Research design

Prior research has typically approached the question of whether firms use DACC to achieve earnings targets by examining average DACC conditional on either earnings or non-discretionary earnings relative to target. For example, DeFond and Park (1999) report that firms use DACC to achieve earnings in excess of forecasts by 2 to 3 cents per share. They find that DACC are income-increasing on average if the earnings surprise is less than 2 cents, income-decreasing if the earnings surprise is more than 3 cents, and insignificantly different from zero if the earnings surprise is 2 or 3 cents. Cheng (2000) also investigates the relationship between DACC and earnings surprises and observes that firms with non-discretionary earnings below forecasts report positive DACC on average, while firms with non-discretionary earnings above forecasts report negative DACC on average. This approach does not address the extent to which DACC are used successfully to manage earnings from below to above targets. It also does not answer the question of whether the discontinuity in the distribution of earnings relative to targets is specifically caused by DACC. If earnings management underpins observed discontinuities in earnings distributions, then earnings management should be used by more firms to move from below to above target than in the opposite direction. The finding that firms with small profits have higher DACC than firms with small losses does not provide such a demonstration. It is possible that at least as many firms move from non-discretionary (pre-managed) profits to reported (post-managed) losses as move from non-discretionary losses to reported profits while at the same time finding that firms with non-discretionary profits (losses) have negative (positive) DACC.

We first examine whether earnings levels, changes and surprises are distributed with a discontinuity at zero, similar to Burgstahler and Dichev (1997) and Degeorge et al. (1999). Such

discontinuities would be consistent with, but not necessarily proof of, earnings management to achieve targets. Thus, we test the following prediction:

H1: The frequency of small negative earnings levels (changes, surprises) is lower than expected and the frequency of small positive earnings levels (changes, surprises) is higher than expected under a smooth distribution⁶

To the extent that DACC cause the discontinuity in the earnings distribution, the removal of DACC from earnings is expected to reduce the discontinuity. Specifically, we predict that the distributions of non-discretionary earnings do not display discontinuities around earnings targets, and test the following prediction:

H2: The frequencies of small negative non-discretionary earnings levels (changes, surprises) and small positive non-discretionary earnings levels (changes, surprises) are equal to the frequencies expected under a smooth distribution

Further, the use of DACC to achieve targets will be reflected in DACC having the effect of increasing the proportion of firm-years achieving earnings targets. This implies the following prediction:

H3: The proportion of firm-years with positive earnings levels (changes, surprises) is larger than the proportion of firm-years with positive non-discretionary earnings levels (changes, surprises)

The previous evidence on the distribution of earnings relative to targets suggests that earnings management to achieve targets occurs most extensively when the shortfall from target is small. In particular, it is suggested that firms seek to manage earnings to transform small deficits into small surpluses relative to targets. Thus, we test the following predictions:

H4: The proportion of firm-years with small positive earnings levels (changes, surprises) is larger than the proportion of firm-years with small positive non-discretionary earnings levels (changes, surprises)

H5: The proportion of firm-years with small negative earnings levels (changes, surprises) is smaller than the proportion of firm-years with small negative non-discretionary earnings levels (changes, surprises)

One important caveat must be noted with respect to the last prediction. It is based on the assumed earnings management objectives of achieving positive earnings levels and changes and avoiding negative earnings surprises. It does not take account of other earnings management strategies,

⁶ For the purpose of efficient expression, we use the terms negative and positive to describe earnings and non-discretionary earnings relative to target. Strictly, our usage of positive (negative) in the context of earnings levels, non-discretionary earnings levels, earnings changes and non-discretionary earnings changes refers to observations greater than (less than or equal to) zero. Our usage of positive (negative) in the context of earnings surprises and non-discretionary earnings surprises refers to observations greater than or equal to (less than) zero. This is in accordance with our assumption that firms seek to achieve positive earnings levels and changes and avoid negative earnings surprises, and with the consequential design of our empirical tests.

e.g., reducing the magnitude of earnings changes or surprises, which firms might simultaneously pursue. This would have implications for H5. Specifically, the use of DACC to smooth income might result in DACC increasing the proportion of firm-years with small negative earnings changes and reducing the proportion of firm-years with large negative earnings changes. We regard the question of whether firms use DACC to dampen earnings levels, changes or surprises as an empirical issue to be taken into account when presenting and discussing our results.

3. Sample and data

We test the above empirical predictions, and provide related evidence, on a sample comprising all UK quoted non-financial firms over the years 1989 to 1998.⁷ We exclude financial firms because of our interest in working capital accruals, the accrual generating process being considerably different in financial firms (Peasnell et al., 2000:318). We further restrict the sample to accounting periods of approximately one year in duration, defined as not less than 350 or more than 380 days. We impose this requirement because accounting flow variables such as earnings are incomparable if they relate to periods of different duration.⁸

Our primary data source for tests on earnings levels and changes is Datastream. For these tests, we measure earnings (EARN) in a hybrid manner across implementation of an important UK reporting standard, FRS 3.⁹ In pre-FRS 3 accounting periods, we measure EARN as earnings before extraordinary items. In post-FRS 3 accounting periods, we measure EARN as earnings before extraordinary and special or non-operating exceptional items.¹⁰ The special items we exclude are items that could have been extraordinary pre-FRS 3, are exceptional post-FRS 3, and are required by FRS 3 to be disclosed separately on the face of the income statement.¹¹ We measure scaled earnings level (E) as $EARN_t/TA_{t-1}$, and scaled earnings change (ΔE) as $(EARN_t - EARN_{t-1})/TA_{t-1}$.

Our analysis of earnings *before* extraordinary items is consistent with Degeorge et al. (1999) but contrasts with Burgstahler and Dichev (1997) who examine earnings *after* extraordinary items. Theory is unclear about which earnings measure managers seek to manipulate, or how this measure is identified. We focus on earnings before extraordinary items because the investment analyst community would appear to make wider use of earnings measured before extraordinary items.¹² This increases the incentive for firms to manage earnings before extraordinary items relative to basic targets. Further, there is UK evidence that earnings before extraordinary items is less timely in reflecting bad news than earnings after extraordinary items (Pope and Walker, 1999). The fact

that classification of extraordinary items can be used as a means to manage earnings before extraordinary items makes it especially interesting to study whether DACC are also used to manage this earnings measure. For completeness, we also report evidence on pre- and post-FRS 3 periods, on using earnings after extraordinary items (EAXI) and on the use of extraordinary and special items to achieve earnings targets (see Section 5).

For the purposes of tests on earnings surprises, we obtain actual and forecasted earnings from I/B/E/S.¹³ We restrict the sample to those consensus forecasts based on at least three individual forecasts, and use the median forecast from the last available month before the earnings announcement as the proxy for forecasted earnings. We require at least three individual forecasts so as to ensure that the median is a reliable measure.¹⁴ We use the median instead of the mean so as to minimise the effect of individual forecasts with unusual errors having excessive influence on the

⁷ We use Datastream live and dead UK quoted equity lists, UKQI and DEADUK. These lists are based on issued securities and include a number of instances where individual firms are listed more than once as a result of multiple issues. We identify these cases and retain in the sample only one equity class per firm-year.

⁸ Of our final earnings level sample of 10,197 firm-years, 1,561 (15.3%) observations have less than 365 or more than 366 days.

⁹ FRS 3 was issued on 29 October 1992, voluntary compliance being immediately optional and mandatory compliance required in relation to accounting periods ending on or after 22 June 1993. FRS 3 redefined ordinary and extraordinary activities with the effect of abolishing extraordinary items in the UK.

¹⁰ Our pre-FRS 3 EARN is Datastream account code (DS) 625, and our post-FRS 3 EARN is DS625-(DS1083-DS1094-DS1097). We measure other variables in terms of Datastream account codes as follows. WCA is $\Delta(DS376-DS375)-\Delta(DS389-DS309)$, REV is DS104, TA is DS392, XI is DS193 and SI is DS1083-DS1094-DS1097.

¹¹ These items, listed in para. 20 of FRS 3, are profits or losses on sale or termination of operations, costs of fundamental reorganisations or restructuring, and profits or losses on sale of fixed assets. Ernst & Young (1999) uses the terminology non-operating exceptional to describe these items. Exclusion of these items from our post-FRS 3 measure of earnings closely resembles the adjustments made by Lin and Walker (2000) in their post-FRS 3 construct of headline earnings.

¹² I/B/E/S International Inc. (1996:6) points out that analysts generally make forecasts of earnings on a continuing basis, i.e., excluding extraordinary and other non-operating items. Similarly, SIP 1 (1993) excludes extraordinary and several other non-maintainable items from the definition of headline earnings. Lin and Walker (2000) report that, in terms of explaining stock prices, headline or maintainable earnings performs generally better than FRS 3 earnings, which includes non-operating exceptional or formerly extraordinary items.

¹³ We only have access to I/B/E/S data for 1990 onwards. Perhaps because of this and contrary to Brown and Higgins (2001), we do not find a time-dependent bias in the occurrence of exact forecasts.

¹⁴ The median forecast horizon, i.e. period between forecasts and earnings announcements, is 28 days

Table 1
Descriptive statistics

Panel A Earnings level sample N=10,197					
	<i>Mean</i>	<i>Median</i>	<i>Q3</i>	<i>Q1</i>	<i>Std. Dev.</i>
E_t	0.055	0.062	0.101	0.024	0.089
NDE_t	0.055	0.059	0.117	-0.001	0.114
$DACC_t$	0.000	0.000	0.039	-0.040	0.078
Panel B Earnings change sample N=10,209					
	<i>Mean</i>	<i>Median</i>	<i>Q3</i>	<i>Q1</i>	<i>Std. Dev.</i>
ΔE_t	0.007	0.008	0.028	-0.014	0.063
$ND\Delta E_t$	0.007	0.005	0.055	-0.045	0.100
$DACC_t$	0.000	0.000	0.039	-0.041	0.078
Panel C Earnings surprise sample N=4,380					
	<i>Mean</i>	<i>Median</i>	<i>Q3</i>	<i>Q1</i>	<i>Std. Dev.</i>
ES_t	-0.001	0.001	0.003	-0.001	0.013
$NDES_t$	0.002	0.002	0.034	-0.030	0.060
$DACC_t$	-0.003	-0.002	0.029	-0.034	0.058
E = Earnings scaled by opening total assets NDE = Non-discretionary earnings scaled by opening total assets ΔE = Change in earnings scaled by opening total assets $ND\Delta E$ = Non-discretionary earnings change in earnings scaled by opening total assets ES = Earnings surprise scaled by opening total assets $NDES$ = Non-discretionary earnings surprise scaled by opening total assets $DACC$ = Discretionary working capital accruals scaled by opening total assets, estimated using Jones (1991) model					

measure of central tendency. Thus, we measure the earnings surprise (ES) as actual earnings minus the median forecast scaled by opening TA.

We estimate DACC by applying a cross-section-

¹⁵ Collins and Hribar (2002) express the concern that measuring accruals as the change in balance sheet accounts introduces measurement error into total accruals, primarily as a result of mergers, acquisitions and discontinued operations. They state that the error in total accruals measured through the balance sheet approach is unlikely to be correlated with the assumed drivers of accruals in the Jones (1991) model, resulting in the measurement error being captured entirely by the residual or discretionary accruals estimate. We believe their conjecture on the correlation between the measurement error and change in revenue, in particular, is counter-intuitive. Change in total consolidated revenue is, a priori, no less susceptible to influence by mergers, acquisitions and discontinued operations than change in working capital balances. In any case, measuring total accruals using the cash flow statement, which is the approach preferred by Collins and Hribar (2002), is itself not unproblematic. The difference between operating profit and operating cash flow usually includes a number of idiosyncratic accruals that cannot be classified systematically as either discretionary or non-discretionary.

al version of the Jones (1991) model to working capital accruals. Under this model, normal or non-discretionary accruals are assumed to be a function of designated factors or drivers. The component of accruals not explained by these drivers is denoted as abnormal or discretionary. In the original Jones (1991) formulation, total accruals are modeled as a function of the change in total sales (ΔREV) and gross property, plant and equipment (PPE). The former is argued to drive short term accruals or WCA and the latter to drive long term accruals, most notably depreciation.

Our focus is on the discretionary component of WCA. We believe that long term accruals such as depreciation are unlikely to be an effective means of managing earnings given their visibility and the ability of the market to observe, and unwind the earnings implications of, any attempt to manipulate them (Young 1999:842). We measure total WCA as the change in non-cash working capital.¹⁵ We then estimate the following cross-sectional OLS regression for each Datastream level-6 industry-year, using all valid firm-years with available

data but requiring a minimum of six observations per regression.¹⁶

$$WCA_{ijt}/TA_{ijt-1} = \beta_{0jt} + \beta_{1jt} \Delta REV_{ijt}/TA_{ijt-1} + \varepsilon_{ijt} \quad (1)$$

where i , j and t are firm, industry and time subscripts respectively. This regression facilitates partitioning of WCA into non-discretionary accruals (NDACC) and DACC. NDACC are measured as the predicted component of WCA and DACC as the residual resulting from this regression. Thus:

$$DACC_{ijt} = WCA_{ijt}/TA_{ijt-1} - NDACC_{ijt} \quad (2)$$

$$= WCA_{ijt}/TA_{ijt-1} - (\hat{\beta}_{0jt} + \hat{\beta}_{1jt} \Delta REV_{ijt}/TA_{ijt-1})$$

where $\hat{\beta}_0$ and $\hat{\beta}_1$ are the industry-year OLS parameters estimated above.

In our use of the Jones (1991) model rather than available alternatives, we are guided by Peasnell et al. (2000). They evaluate the specification and power of alternative methods of estimating DACC using UK data. The results they report suggest that, on the whole, alternative models currently available are not superior to the Jones (1991) model in terms of ability to detect plausible levels of earnings management. Our measure of WCA and the DACC estimation technique closely resemble those used by Peasnell et al. (2000).

Having estimated DACC as described above, we measure non-discretionary earnings (NDE), non-discretionary earnings change (NDAE) and non-discretionary earnings surprise (NDES) as E-DACC, Δ E-DACC and ES-DACC respectively. Our earnings levels tests are conducted on an earnings level sample defined as all observations from the above-described main sample for which E, NDE and DACC are available, and having deleted the extreme%iles of E, NDE and DACC. Our earnings change and surprise samples are defined in a similar manner, with E (NDE) being replaced by Δ E (NDAE) and ES (NDES) respectively.

These criteria result in earnings level, change and surprise samples of 10,197, 10,209 and 4,380 observations respectively. Basic descriptive statistics on these samples are presented in Table 1. Mean (median) E, Δ E and ES are 0.055 (0.062), 0.007 (0.008) and -0.001 (0.001) for the earnings level, change and surprise samples respectively. As expected, mean (median) DACC is zero (zero) for both the earnings level and change samples.¹⁷

However, the earnings surprise sample has mean (median) DACC of -0.003 (-0.002).

4. Results

4.1. Distribution of earnings and non-discretionary earnings relative to target

We predict in H1 that earnings relative to targets will be distributed discontinuously around zero, consistent with firms managing earnings to avoid small deficits and achieve small surpluses. We further predict in H2 that the exclusion of discretionary accruals from current period earnings will cause the discontinuity around zero to disappear. The evidence on these hypotheses is reported in Figure 1 and Table 2. Figure 1 presents histograms of reported and non-discretionary earnings levels, changes and surprises. It also shows the differences between the frequency of reported earnings and non-discretionary earnings relative to target in each class, thus illustrating the impact that DACC have on the distribution of earnings relative to targets.¹⁸ Table 2 reports the Burgstahler and Dichev (1997) standardised difference statistics relating to the classes at both immediate sides of zero in the distributions reported in Figure 1.¹⁹

The distribution of earnings levels, shown in Figure 1 Panel A1 reveals a distinct discontinuity at zero. The frequency at the immediate left of zero is low and that on the immediate right of zero is high relative to expected frequencies under a smooth distribution. As predicted, Panel A2 shows that the distribution of non-discretionary earnings levels is relatively smooth around zero. There is little disparity between the frequencies immediately adjacent to zero. Panel A3 confirms that DACC have the effect of increasing the frequency of small positive earnings and decreasing the frequency of small negative earnings. In addition, DACC have the effect of reducing the frequency of both large positive and large negative earnings.

Table 2 Panels A1 and A2 confirm the visual impressions regarding the impact of DACC around zero earnings. Panel A1 indicates that the actual frequency of the class to the immediate left of zero in the earnings distribution is significantly less than the expected frequency of that class under the null hypothesis of a smooth distribution. On the other hand, Panel A2 indicates that the actual frequency of the class to the immediate left of zero in the non-discretionary earnings distribution is insignificantly different from its expected frequency. This confirms our H1 and H2 predictions that earnings is distributed discontinuously around zero, while non-discretionary earnings is not.

Figure 1 Panel B1 shows the distribution of earnings changes. This histogram reveals a discontinuity at zero, caused by the frequency at the immediate right of zero appearing to be higher and that at the immediate left of zero lower than ex-

¹⁶ DeFond and Jiambalvo (1994) and Young (1999) also require a minimum of six observations.

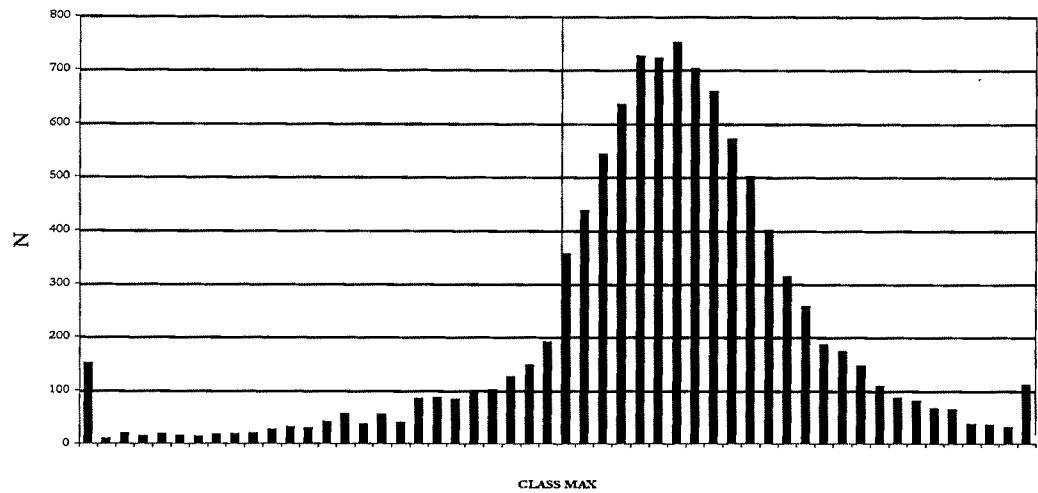
¹⁷ Given that DACC is estimated as an OLS residual, the population average is zero by construction.

¹⁸ The high frequencies shown in the extreme upper and lower bins in all panels of Figure 1 are a result of truncating the range of the graphs and combining the remaining bins.

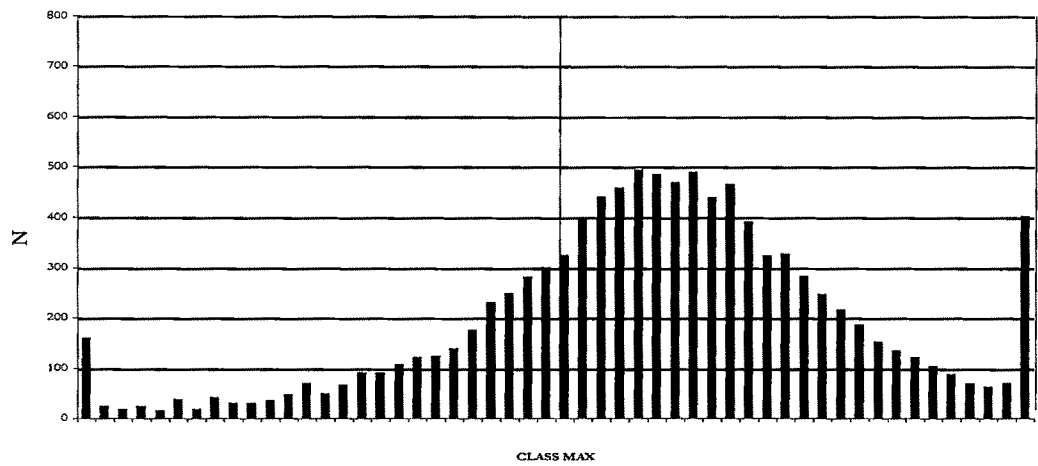
¹⁹ We use increasingly narrow bands or bin widths as we move from earnings levels to changes to surprises because of the degree of concentration around zero in these respective distributions.

Figure 1 (Panel A)
Histograms of earnings and non-discretionary earnings levels

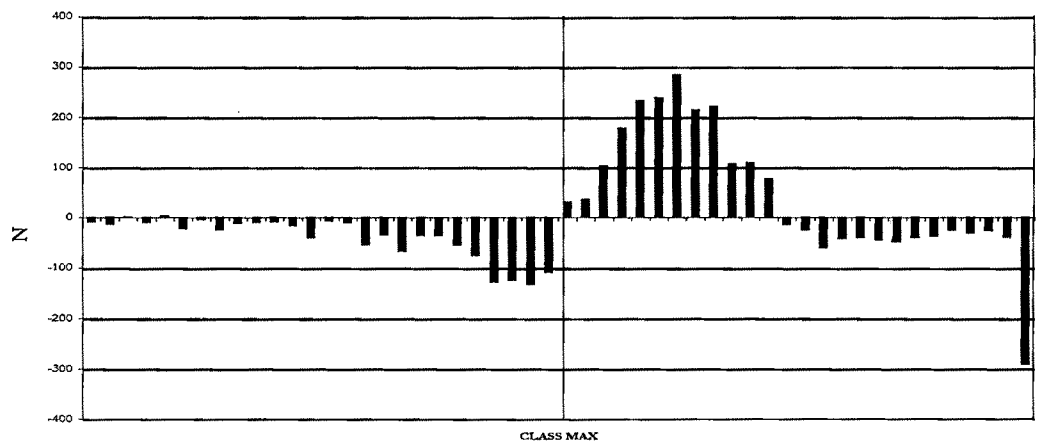
Panel A1 Earnings levels



Panel A2 Non-discretionary earnings levels



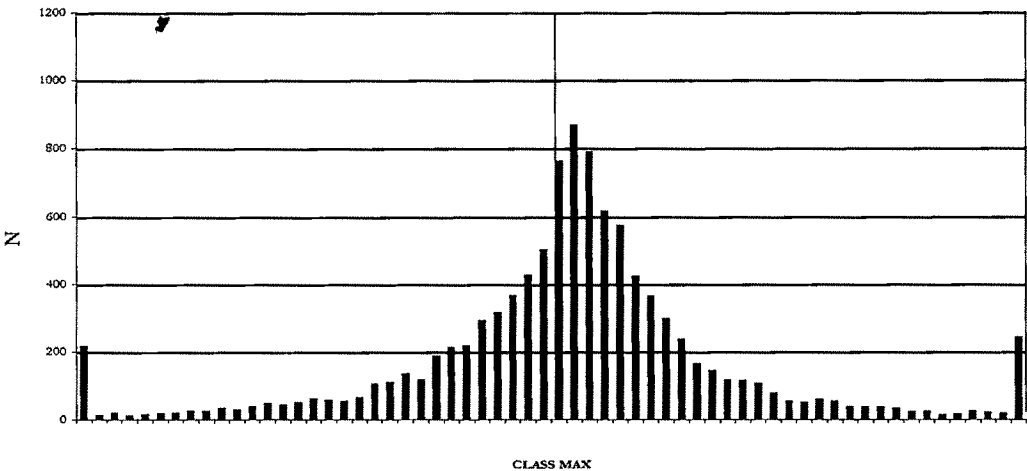
Panel A3 Difference in frequency of earnings and non-discretionary earnings level



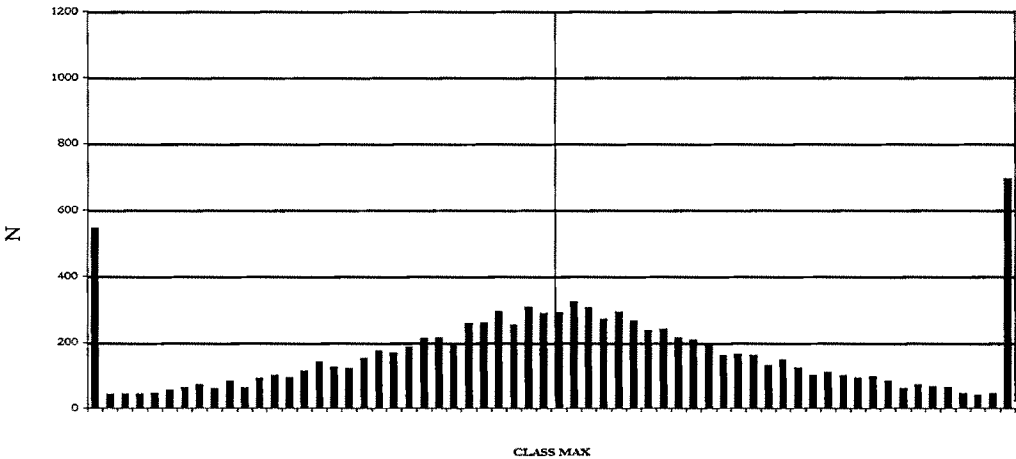
N=10,197 Class width 0.01

Figure 1 (Panel B)
Histograms of earnings and non-discretionary earnings changes

Panel B1 Earnings changes



Panel B2 Non-discretionary earnings changes



Panel B3 Difference in frequency of earnings change and non-discretionary earnings change

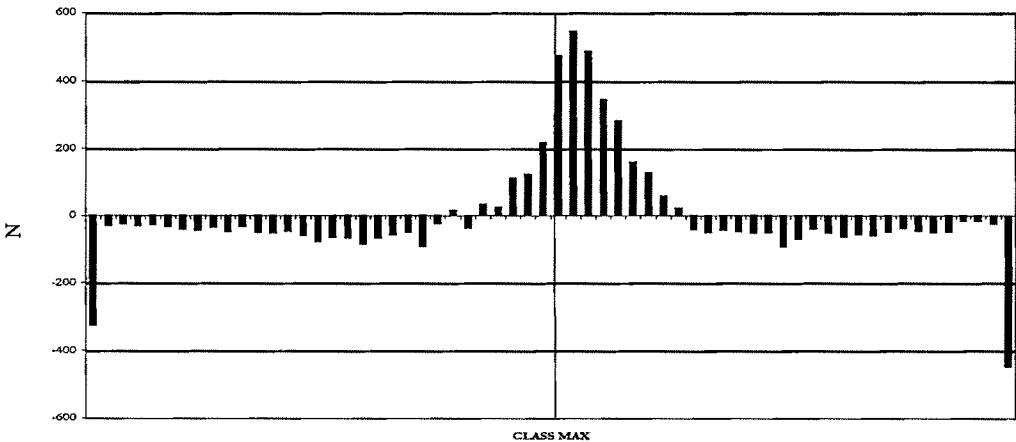
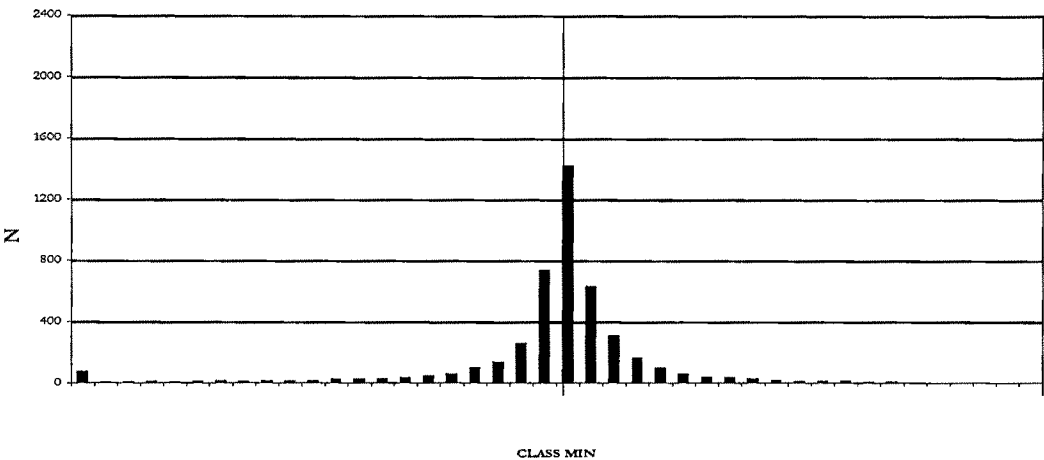
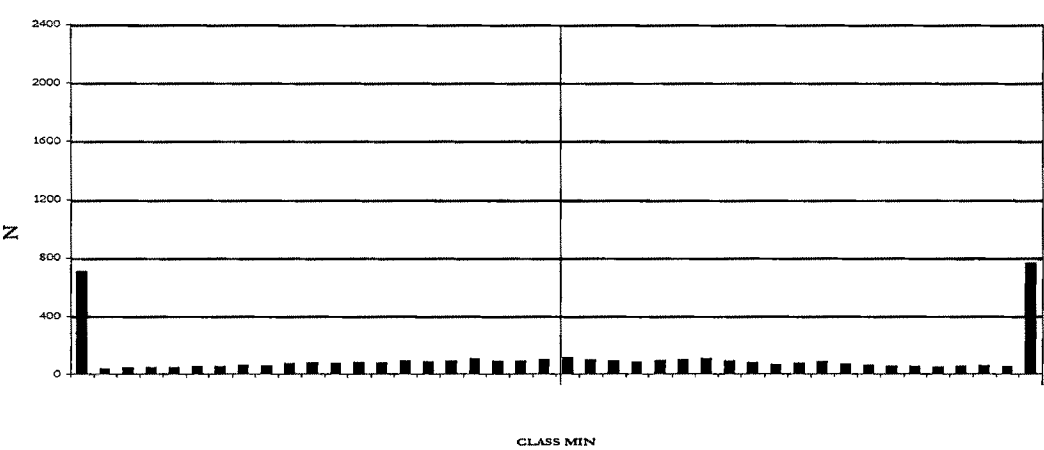


Figure 1 (Panel C)
Histograms of earnings and non-discretionary earnings surprises

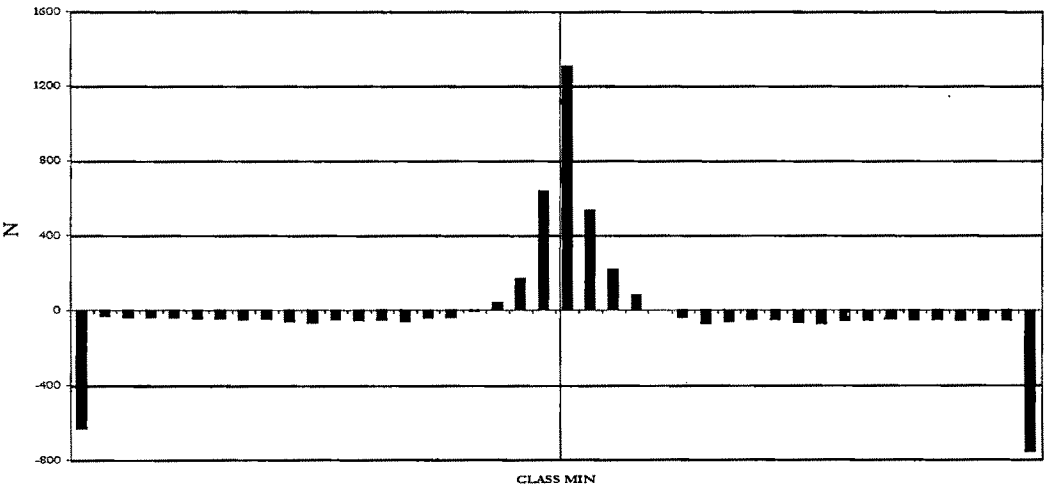
Panel C1 Earnings surprises



Panel C2 Non-discretionary earnings surprises



Panel C3 Difference in frequency of earnings surprise and non-discretionary earnings surprises



N=4,380 Class width 0.0025

Table 2
Distribution of near-zero earnings and non-discretionary earnings relative to targets

Panel A1

Earnings level
 N=10,197

Class	$-0.01 < E_t \leq 0$	$0 < E_t \leq 0.01$
<i>n</i>	190	356
<i>Std. Diff.</i>	-3.516	1.942
<i>p value</i>	0.000	0.052

Panel A2

Non-discretionary earnings level
 N=10,197

Class	$-0.01 < NDE_t \leq 0$	$0 < NDE_t \leq 0.01$
<i>n</i>	300	325
<i>Std. Diff.</i>	-0.144	-1.144
<i>p value</i>	0.885	0.253

Panel B1

Earnings change
 N=10,209

Class	$-0.005 < \Delta E_t \leq 0$	$0 < \Delta E_t \leq 0.005$
<i>n</i>	503	763
<i>Std. Diff.</i>	-3.380	2.463
<i>p value</i>	0.001	0.014

Panel B2

Non-discretionary earnings change
 N=10,209

Class	$-0.005 < NDAE_t \leq 0$	$0 < NDAE_t \leq 0.005$
<i>n</i>	286	289
<i>Std. Diff.</i>	-0.538	-0.705
<i>p value</i>	0.590	0.481

Panel C1

Earnings surprise
 N=4,380

Class	$-0.0025 \leq ES_t < 0$	$0 \leq ES_t < 0.0025$
<i>n</i>	734	1415
<i>Std. Diff.</i>	-3.442	21.225
<i>p value</i>	0.001	0.000

Panel C2

Non-discretionary earnings surprise
 N=4,380

Class	$-0.0025 \leq NDES_t < 0$	$0 \leq NDES_t < 0.0025$
<i>n</i>	98	111
<i>Std. Diff.</i>	-0.209	1.085
<i>p value</i>	0.835	0.278

- a E = Earnings scaled by opening total assets
 NDE = Non-discretionary earnings scaled by opening total assets
 ΔE = Change in earnings scaled by opening total assets
 NDAE = Non-discretionary earnings change in earnings scaled by opening total assets
 ES = Earnings surprise scaled by opening total assets
 NDES = Non-discretionary earnings surprise scaled by opening total assets
 DACC = Discretionary working capital accruals scaled by opening total assets, estimated using Jones (1991) model

- b This table shows the Burgstahler and Dichev (1997) standardised difference statistic for the classes at the immediate left and right of zero in the distributions of actual and non-discretionary earnings levels, changes and surprises scaled by opening total assets. This statistic is measured as the difference between the actual and expected frequencies in the class concerned, standardised by the standard deviation of this difference. The expected frequency of each class is assumed to be the mean of the two immediately adjacent classes. In other words, if the number of observations in class *i* is denoted by *n_i*, the probability of an observation occurring in class *i* denoted by *p_i*, and the total number of observations in the sample denoted by *N*, the test statistic for class *i* is given by:

$$\frac{n_i - \frac{(n_{i-1} + n_{i+1})}{2}}{\sqrt{Np_i(1-p_i) + \frac{N(p_{i-1} + p_{i+1})(1-p_{i-1}-p_{i+1})}{4}}}$$

- c This statistic is evaluated against the standardised normal distribution.
 d All *p values* reported are two-tailed.

pected. As predicted, the distribution of non-discretionary earnings changes shown in Panel B2 does not have a similar discontinuity at zero. The frequencies at the immediate sides of zero appear indistinguishable from each other, and the entire distribution appears symmetrical around zero. The distribution of actual earnings changes has relatively heavy density over a range of small positive earnings changes. Panel B3 shows that DACC have the effect of increasing the frequency of small positive earnings changes, increasing the frequency of small negative earnings changes to a lesser extent, and reducing the frequency of large positive and negative earnings changes.

Evidence confirming our H1 and H2 predictions regarding the effect of DACC on the discontinuity in the distribution of earnings changes is presented in Table 2. Panel B1 indicates that the frequency of the class to the immediate left of zero in the earnings change distribution is significantly less than expected had the distribution been smooth. However, this is not the case in the distribution of non-discretionary earnings changes. Panel B2 shows that the frequency to the immediate left of zero is insignificantly different from that expected under a smooth distribution.

In Figure 1 Panel C1, we present the distribution of earnings surprises. This distribution reveals high concentration around zero, with more than 85% of all firm-years reporting earnings surprises within a 1.25% of TA band around zero. Consistent with our H1 prediction the frequency to the immediate right of zero is markedly greater than that at the immediate left of zero. Panel C2 reports the distribution of non-discretionary earnings surprises, with little observable disparity between frequencies immediately either side of zero. This distribution is dispersed over a wide range, consistent with DACC being used to manage earnings towards forecast and with analysts anticipating a significant part of DACC. This is confirmed in Panel C3, which indicates that DACC have the effect of causing convergence of earnings and forecasts. Specifically, DACC increase the frequency of small magnitude surprises and reduce the frequency of large magnitude surprises. It is also clear from this panel that DACC increase the frequency of small positive surprises to a greater extent than small negative surprises.

Table 2 Panel C1 confirms that the frequency of the class to the immediate left of zero in the earnings surprise distribution is significantly less than expected under the null hypothesis of a smooth distribution. In contrast, the actual frequency of this class in the non-discretionary earnings surprise distribution (Panel C2) is insignificantly different from the expected frequency. This is consistent with our H1 and H2 predictions that earnings surprises are distributed discontinuously

around zero while non-discretionary earnings surprises are not.

In summary, therefore, we find that earnings levels, changes and surprises are distributed with visible and statistically significant discontinuities around zero. Specifically, in each of these distributions, the frequency to the immediate right of zero is greater than expected and the frequency to the immediate left of zero lower than expected under a smooth distribution. We find, further, that the distributions of non-discretionary earnings levels, changes and surprises are not discontinuous in this manner around zero. This suggests that the discontinuity in the distribution of earnings relative to basic targets is caused by DACC.

4.2. Proportions of firm-years achieving and missing earnings targets as a result of DACC

We predict in H3 that DACC have the effect of increasing the proportion of firm-years reporting positive earnings levels, changes and surprises. We further predict in H4 and H5 that DACC increase the proportion of small positive earnings levels, changes and surprises, and reduce the proportion of small negative earnings levels, changes and surprises. These predictions are based on the hypothesised use of DACC to achieve basic earnings targets.

Preliminary evidence on these predictions is obtained from Figure 1 as discussed above. This figure indicates that DACC increase the proportion of positive and, particularly, small positive earnings levels, changes and surprises, consistent with prediction. Also consistent with prediction, DACC reduce the proportion of small negative earnings levels. However, contrary to prediction, DACC increase the proportion of small negative earnings changes and surprises. While the graphical evidence in Figure 1 clearly illustrates the effects of DACC, it does not indicate the statistical significance of these effects.

Table 3 reports the results of formal tests of the predictions we make in H3, H4 and H5. Panel A shows that DACC (which are mean zero: see footnote 17) have the effect of significantly increasing the proportion of positive earnings levels from 74.8 to 85.2%. DACC also significantly change the proportions of firm-years with positive and negative earnings levels within 0.05 of opening TA. In the case of positive earnings levels within this range, the proportion increases from 20.8 to 26.4%. In the case of negative earnings levels within the same range, the proportion decreases from 12.1 to 6.5%. These changes are consistent with the prediction that DACC are used to manage earnings to achieve positive earnings levels and, in particular, to transform small negative earnings into small positive earnings.

Table 4 shows the impact of DACC in arriving at

Table 3
Proportions of observations achieving and missing earnings targets before and after discretionary accruals

Panel A

Earnings levels

N=10,197

	<i>Proportion</i>	<i>Z</i>	<i>p value</i>
NDE _t >0	0.748	25.718	0.000
E _t >0	0.852		
0<NDE _t ≤0.05	0.208	10.832	0.000
0<E _t ≤0.05	0.264		
-0.05<NDE _t ≤0	0.121	-15.075	0.000
-0.05<E _t ≤0	0.065		

Panel B

Earnings changes

N=10,209

	<i>Proportion</i>	<i>Z</i>	<i>p value</i>
NDΔE _t >0	0.527	18.480	0.000
ΔE _t >0	0.626		
0<NDΔE _t ≤0.025	0.144	38.461	0.000
0<ΔE _t ≤0.025	0.353		
-0.025<NDΔE _t ≤0	0.137	10.170	0.000
-0.025<ΔE _t ≤0	0.186		

Panel C

Earnings surprises

N=4,380

	<i>Proportion</i>	<i>Z</i>	<i>p value</i>
NDES _t ≥0	0.518	7.168	0.000
ES _t ≥0	0.593		
0≤NDES _t <0.0125	0.108	51.101	0.000
0≤ES _t <0.0125	0.553		
-0.0125≤NDES _t <0	0.108	24.647	0.000
-0.0125≤ES _t <0	0.317		

a E = Earnings scaled by opening total assets

NDE = Non-discretionary earnings scaled by opening total assets

ΔE = Change in earnings scaled by opening total assets

NDΔE = Non-discretionary earnings change in earnings scaled by opening total assets

ES = Earnings surprise scaled by opening total assets

NDES = Non-discretionary earnings surprise scaled by opening total assets

DACC = Discretionary working capital accruals scaled by opening total assets, estimated using Jones (1991) model

b This table evaluates the impact of DACC on the frequency of observations of positive, small positive and small negative earnings levels, changes and surprises. The Z statistic shown relates to the Z test for correlated proportions described by Kanji (1993, 48–49). This test evaluates the impact of a given intervention on the proportion of observations satisfying a given criterion by measuring and comparing the proportion before and after the intervention. If the number of observations moving from no to yes relative to the criterion of interest is denoted by b, the number moving from yes to no denoted by c, and the total number of observations denoted by N, the test statistic is given by:

$$\frac{(b-c)/N}{\sqrt{\frac{(b+c)-(b-c)^2/N}{N(N-1)}}}$$

c This statistic is evaluated against the standardised normal distribution.

d All *p values* reported are two-tailed.

the earnings reported by firms. It takes the form of transition matrices (one each for levels, changes and surprises): rows show broad classes of non-discretionary (pre-managed) earnings, columns show such classes of reported earnings. Intersections of rows and columns show the number of firm-years (and proportion of the total) moving from a particular NDE_t ($ND\Delta E_t$, $NDES_t$) class to a particular E_t (ΔE_t , ES_t) class.

Panel A presents details of the frequency with which firms move from specific classes of non-discretionary earnings, e.g. $NDE \leq -0.1$, to specific classes of actual reported earnings, e.g. $0 < E_t \leq 0.05$. We would expect that firms use DACC to move from negative non-discretionary earnings to positive reported earnings, and for this to be particularly so for firm-years close to targets. Panel A reveals that 14% of the entire sample move from negative non-discretionary earnings to positive earnings as a result of DACC. This compares to only 3.6% of the sample moving in the opposite direction, i.e. from positive non-discretionary earnings to negative earnings as a result of DACC,²⁰ thus emphasising the directionality in the use of DACC. Focusing specifically on those firms falling just short of target, i.e. in the range $-0.05 < NDE_t \leq 0$, the effect is even more pronounced: 72.8% of such firms report positive actual (post DACC) earnings $((550 + 261 + 88) / 1,235)$, whereas only 11.1% of those firms with NDE_t just above break even, i.e. $0 < NDE_t \leq 0.05$, move to negative earnings $((20 + 49 + 166) / 2,117)$. Of particular interest is the movement of firms closest to break even. Here 5.4% of the entire sample moves from negative non-discretionary earnings within 0.05 of opening TA to positive earnings within the same range, (i.e. the 550 firm-years in the lower left corner of the upper right quadrant). Although only a small proportion of the total sample, these 550 firm-years represent 44.5% of the 1,235 firm-years within this range.

Table 4 Panel B reports the impact of DACC on the proportion of firm-years achieving and missing positive earnings changes. DACC significantly increase the proportion of firm-years achieving positive earnings changes from 52.7% based on $ND\Delta E_t$ to 62.6% based on reported earnings, i.e. row totals $1,473 + 1,161 + 2,742$ as a proportion of the total of 10,209 compared to the proportion represented by the column totals $3,606 + 1,484 + 1,299$. As with earnings levels, focusing specifically on those firms falling just short of target, i.e.

$-0.025 < ND\Delta E_t \leq 0$, reveals that 58.5% of such firms report positive actual (post DACC) earnings changes $((629 + 126 + 61) / 1,395)$, whereas only 29% of those firms with $ND\Delta E_t$ just above target, i.e. $0 < ND\Delta E_t \leq 0.025$, move to negative actual earnings changes $((49 + 80 + 298) / 1,473)$, again confirming a clear directional bias in movements. DACC also significantly increase the proportion of firm-years with small positive earnings changes, i.e. within 0.025 of opening TA from 14.4 to 35.3%, i.e. row total of 1,473 for $0 < ND\Delta E_t \leq 0.025$ compared to column total of 3,606 for $0 < \Delta E_t \leq 0.025$.

These results are consistent with DACC being used to achieve positive earnings changes. However, contrary to prediction, DACC significantly increase the proportion of negative earnings changes within 0.025 of opening TA from 13.7% (row total of 1,395 for $-0.025 < ND\Delta E_t \leq 0$ to 18.6% (equivalent ΔE_t column total of 1,903). This result reflects the visual impression conveyed by Figure 1.

One potential reason for DACC increasing the proportion of firm-years with small negative earnings changes is the use of DACC to smooth earnings. Smoothing would be reflected by the use of DACC to dampen fluctuations in earnings, i.e., to reduce the magnitude of earnings changes. Table 4 Panel B shows that 789 (i.e. $468 + 321$), or 41.5%, of the 1,903 firm-years with actual negative earnings changes within 0.025 of opening TA use DACC to reduce the magnitude of a larger negative earnings change. If these observations were excluded, the proportion of firm-years with small negative earnings change would move from 13.7 (row total, as before) to 10.9% (the $-0.025 < \Delta E_t \leq 0$ column total of 1,903 minus the 789 firm-years specified above) as a result of DACC. In other words, if firm-years dampening the magnitude of large negative earnings change are excluded, DACC have the effect of reducing the proportion of firm-years with small negative earnings changes, as predicted.

It is important to note that, even if firm-years dampening the magnitude of large positive earnings change are excluded, DACC still have the predicted effect of increasing the proportion of firm-years with small positive earnings changes. In this case, the proportion concerned increases from 14.4 to 22.3% (compare row total of 1,473 as before with column total $3,606$ minus $789 + 543$, the firms reducing large NDE changes by the use of DACC).

Table 4 Panel B also indicates that 20.2% of the entire sample use DACC to move from negative to positive earnings changes, i.e. the cases in the top right-hand quadrant. These 2,059 firm-years represent 42.6% of all firm-years with negative non-discretionary earnings changes, i.e. 2,059 as a

²⁰ The 14 % comprise those observations in the upper right quadrant of the panel, i.e., those firms having negative NDE but reporting positive E $((113 + 191 + 550 + 65 + 84 + 261 + 42 + 36 + 88) / 10197)$. The 3.6 % comprise those observations in the lower left quadrant, i.e. those having positive NDE but reporting negative E $((20 + 7 + 7 + 49 + 14 + 13 + 166 + 57 + 39) / 10197)$.

Table 4
Transition matrices indicating the frequency of movement of observations from classes of non-discretionary earnings to classes of earnings relative to target

Panel A

Earnings level sample

	$E_t \leq -0.1$	$-0.1 < E_t \leq -0.05$	$-0.05 < E_t \leq 0$	$0 < E_t \leq 0.05$	$0.05 < E_t \leq 0.1$	$E_t > 0.1$	Total
$NDE_t \leq -0.1$	362 0.036	88 0.009	82 0.008	113 0.011	65 0.006	42 0.004	752 0.074
$-0.1 < NDE_t \leq -0.05$	59 0.006	98 0.010	110 0.011	191 0.019	84 0.008	36 0.004	578 0.057
$-0.05 < NDE_t \leq 0$	47 0.005	82 0.008	207 0.020	550 0.054	261 0.026	88 0.009	1235 0.121
$0 < NDE_t \leq 0.05$	20 0.002	49 0.005	166 0.016	957 0.094	755 0.074	170 0.017	2117 0.208
$0.05 < NDE_t \leq 0.1$	7 0.001	14 0.001	57 0.006	587 0.058	1248 0.122	432 0.042	2345 0.230
$NDE_t > 0.1$	7 0.001	13 0.001	39 0.004	299 0.029	995 0.098	1817 0.178	3170 0.311
n	502	344	661	2697	3408	2585	10197
proportion	0.049	0.034	0.065	0.264	0.334	0.254	1

Panel B

Earnings change sample

	$\Delta E_t \leq -0.05$	$-0.05 < \Delta E_t \leq -0.025$	$-0.025 < \Delta E_t \leq 0$	$0 < \Delta E_t \leq 0.025$	$0.025 < \Delta E_t \leq 0.05$	$\Delta E_t > 0.05$	Total
$N\Delta E_t \leq -0.05$	753 0.074	390 0.038	468 0.046	504 0.049	153 0.015	107 0.010	2375 0.233
$-0.05 < N\Delta E_t \leq -0.025$	102 0.010	161 0.016	321 0.031	362 0.035	81 0.008	36 0.004	1063 0.104
$-0.025 < N\Delta E_t \leq 0$	69 0.007	121 0.012	389 0.038	629 0.062	126 0.012	61 0.006	1395 0.137
$0 < N\Delta E_t \leq 0.025$	49 0.005	80 0.008	298 0.029	779 0.076	211 0.021	56 0.005	1473 0.144
$0.025 < N\Delta E_t \leq 0.05$	28 0.003	54 0.005	196 0.019	543 0.053	250 0.024	90 0.009	1161 0.114
$N\Delta E_t > 0.05$	48 0.005	62 0.006	231 0.023	789 0.077	663 0.065	949 0.093	2742 0.269
n	1049	868	1903	3606	1484	1299	10209
proportion	0.103	0.085	0.186	0.353	0.145	0.127	1

Panel C

Earnings surprise sample

	$ES_t < -0.025$	$-0.025 \leq ES_t < -0.0125$	$-0.0125 \leq ES_t < 0$	$0 \leq ES_t < 0.0125$	$0.0125 \leq ES_t < 0.025$	$ES_t \geq 0.025$	Total
$NDES_t < -0.025$	93 0.021	65 0.015	398 0.091	642 0.147	28 0.006	8 0.002	1234 0.282
$-0.025 \leq NDES_t < -0.0125$	14 0.003	14 0.003	129 0.029	243 0.055	3 0.001	0 0.000	403 0.092
$-0.0125 \leq NDES_t < 0$	9 0.002	12 0.003	147 0.034	290 0.066	12 0.003	4 0.001	474 0.108
$0 \leq NDES_t < 0.0125$	6 0.001	14 0.003	147 0.034	286 0.065	19 0.004	1 0.000	473 0.108
$0.0125 \leq NDES_t < 0.025$	5 0.001	12 0.003	123 0.028	281 0.064	11 0.003	0 0.000	432 0.099
$NDES_t \geq 0.025$	29 0.007	120 0.027	445 0.101	681 0.155	67 0.015	22 0.005	1364 0.311
n	156	237	1389	2423	140	35	4380
proportion	0.036	0.054	0.317	0.553	0.032	0.008	1

E = Earnings scaled by opening total assets

NDE = Non-discretionary earnings scaled by opening total assets

 ΔE = Change in earnings scaled by opening total assets

NDAE = Non-discretionary earnings change in earnings scaled by opening total assets

ES = Earnings surprise scaled by opening total assets

NDES = Non-discretionary earnings surprise scaled by opening total assets

DACC = Discretionary working capital accruals scaled by opening total assets, estimated using Jones (1991) model

proportion of the relevant row totals of $2,375 + 1,063 + 1,395$. Again focusing specifically on those firms close to the target, in this case matching the prior year's result; of the entire sample, 6.2% of all firm-years move from negative non-discretionary earnings changes within 0.025 of opening TA to positive earnings changes within a similar range (i.e. the bottom left figure in the upper right quadrant). Of the 1,395 firm-years with small negative non-discretionary earnings changes within this range, 58.5% actually report positive earnings changes with the aid of DACC ($(629 + 126 + 61) / 1,395$).

In a similar manner, in Table 4 Panel C, we assess the impact of DACC on the proportion of firm-years meeting and missing analyst forecasts. This panel indicates that DACC significantly increase the proportion of firm-years with positive earnings surprises from 51.8 to 59.3%, i.e. the row totals $473 + 432 + 1,364$ (being the firm-years with NDES above zero) compared to the column totals $2,423 + 140 + 35$ (the firm-years with ES above zero), both totals being divided by 4,380. Strikingly, and in accordance with our prediction, DACC greatly increase the proportion of firm-years with small positive earnings surprises, within 0.0125 of opening TA, from 10.8 to 55.3% (i.e. the row total for $0 < \text{NDES}_i \leq 0.0125$ compared to the column total for $0 < \text{ES}_i \leq 0.0125$). However, contrary to prediction, DACC increase the proportion of firm-years with negative earnings surprises within a similar range from 10.8 to 31.7%.

As suggested earlier for earnings, this last point is potentially explained by the use of DACC to reduce the magnitude of large negative earnings surprises. Table 4 Panel C shows that DACC have the effect of facilitating 12% of the sample ($398 + 129$) moving from a larger negative surprise to one within 0.0125 of opening TA. However, even if these observations are excluded, DACC still have the effect of increasing the proportion of small negative earnings surprises from 10.8% (the row total, as before) to 19.6% (the column total of $1,389$ minus $398 + 129$), contrary to prediction. Clearly, however, the increase is less dramatic when these observations are excluded.

Table 4 Panel C also indicates that 6.6% of the sample appears to use DACC to move from a negative surprise within 0.0125 of opening TA to a positive surprise within the same range (the bottom left corner of the upper right quadrant). These 290 cases represent 61.2% of all firm-years with negative non-discretionary earnings surprises within 0.0125 of opening TA (the row total of 474). Further, 58.3% of all firm-years with negative non-discretionary earnings surprises report positive actual surprises with the help of DACC, i.e. the total of firm-years in the upper right quadrant divided by the sum of the row totals $1,234 +$

$403 + 474$).

In summary, DACC significantly increase the proportions of firm-years reporting positive earnings levels, changes and surprises, as predicted. DACC also have the effect of significantly increasing the proportion of firm-years reporting small positive earnings levels, changes and surprises, and reducing the proportion of firm-years reporting small negative earnings levels. This is consistent with DACC being used to achieve positive earnings levels, changes and surprises, and with DACC causing the discontinuity in the distribution of earnings. However, contrary to prediction, DACC result in increases in the proportions of firm-years with small negative earnings changes and surprises. We show that this is mainly because DACC also serves the purpose of dampening the magnitude of large negative earnings changes and surprises in significant numbers of firm-years.

4.3. Sensitivity analysis

To assess the robustness of our results to the choice of discretionary accruals model, we re-estimate non-discretionary earnings using five alternative models and recompute the results reported in Figure 1 and Tables 2, 3 and 4. We use two versions of the modified-Jones model (Dechow et al., 1995) based on working capital accruals and three others, versions of both the original Jones and the modified-Jones models, based on total accruals.

The results achieved are consistent with those reported above. Examination of graphical representations of reported and non-discretionary earnings relative to targets, per Figure 1, confirms our main results. Examining the results statistically reveals for reported earnings a discontinuity around zero in all 30 cases, i.e. five discretionary accruals models, each for levels, changes and surprises, examining one bin either side of zero for each. For non-discretionary earnings, no statistically significant discontinuity is found in the 30 cases examined except when using one of the total accruals-based modified-Jones models for surprises (below zero bin p value 0.085). We also achieve qualitatively similar results using market value of equity (rather than total assets) to scale the variables in Equations 1 and 2. Further, our results for earnings surprises are again similar when using unscaled EPS (contrary to Durtschi and Easton's (2005) suggestion).

Replicating for earnings levels, changes and surprises the tests of proportion reported in Table 3, i.e. achieving and missing earnings targets, both overall and for each of small positive and small negative movements, reveals no instances contradicting the main results. Of 45 tests conducted (five discretionary accruals models, each for levels, changes and surprises, and each for overall,

small positive and small negative) only two give results with a *p* value other than 0.000 and these are each 0.005.

It could be argued that our finding of the disappearance of the discontinuity around zero is a statistical artefact deriving from our approach of removing DACC from reported earnings (changes, surprises) in order to arrive at NDE (changes, surprises). That is, a (smooth) approximation of a normal distribution may be the result of subtracting one distribution from another. To test this, we remove from earnings for each firm-year a randomly determined 'pseudo-accrual' component of earnings (rather than DACC) sampled from a normal distribution with mean and standard deviation set equal to the distribution of DACC for the specific earnings bin, and re-run our tests. We repeat this procedure 1,000 times. Whereas our main results show the removal of DACC almost always leads to the disappearance of the discontinuity from NDE (see above), discontinuities in 'pseudo-NDE' (i.e. earnings after removal of the 'pseudo-accrual' component) remain in 2% of cases. A binomial test, significant at the 1% level, rejects the null of a smooth distribution (as obtained in our main tests).²¹

We therefore conclude that our results are robust to not only different specifications of DACC but also that they represent a real, rather than a statistical, effect.

5. Did FRS 3 alter company earnings management activities?

As documented above, our main analysis concerning discontinuities around zero is based upon samples drawn from the period of 1989–1998. Mid-way through that period, a new financial reporting standard, FRS 3 (Accounting Standards Board, 1992) was introduced, in part to prevent the use of extraordinary items as an earnings management tool. At the time, it had been noted that a large majority of extraordinary items, i.e. those outside the normal course of business and thus

shown 'below the line', were income-decreasing while the majority of exceptional items, i.e. within the normal course of business items and thus 'above the line', were income-increasing. This *prima facie* case of the misuse of extraordinary items, i.e. either classifying ordinary expenses as extraordinary expenses or extraordinary revenues as ordinary revenues, led to their virtual elimination by FRS 3.²² If this basis for the standard was valid, its introduction would have necessitated the alteration of companies' earnings management techniques. We therefore re-run our main tests on pre-FRS 3 and post-FRS 3 sub-samples.²³

For earnings levels, we find that in the pre-FRS 3 period the discontinuity in earnings noted previously is absent, whereas in the post-FRS 3 period it is present. This suggests that a change of earnings management behaviour did indeed occur around the time of FRS 3's issuance. Our whole-period result thus reflects a weighted averaging of the two sub-period results, with the absence of an effect in the earlier period (about one-third of our observations) serving partially to mask the effect clearly evident in the later period (about two-thirds of our observations), i.e. the results reported for the whole period are a conservative estimate of the post-FRS 3 period effect. In contrast to this, but consistent with our expectations, the absence of a discontinuity for NDE that we find for the whole period sample is also evident for both of the sub-periods.

Also consistent with our prior expectations and our whole period results, our tests of earnings changes show, for both pre-FRS3 and post-FRS 3 sub-periods, a clear discontinuity in ΔE but none in ΔNDE . The differing results for the pre-FRS 3 period earnings levels and changes may be attributed to the (mis)use then of XI to achieve break even, i.e. an absolute target, but the necessity to manage earnings using DACC to achieve the prior year's EXBI result, i.e. a relative target not achievable using XI themselves.

For earnings surprises, the results are again in line with those for the whole period, i.e. both pre- and post-FRS 3 periods show the expected discontinuity in ES, although the results are less clear cut than those for ΔE . Again, this suggests the use of DACC to meet a target not amenable to XI manipulation.

The tests on the two sub-periods described above are, as for those on the whole period, conducted in terms of earnings levels, changes and surprises *before* extraordinary items (as detailed on pages 11–12). This is because we hypothesise that it is earnings before extraordinary items (EBXI) that are the focus of analyst interest and hence of earnings management activities. However, whether this is actually the relevant target is an empirical question. We thus repeat the

²¹ We are grateful to one of our reviewers for suggesting this additional test of our results.

²² Post-FRS 3, most items that previously classified as extraordinary (XI) became special (SI)

²³ We exclude accounting periods ending in the period during which compliance with FRS 3 was voluntary. This is to avoid any bias caused by self-selection in compliance. *Accountancy* (1993) reports that firms were voluntarily adopting FRS 3 in financial statements issued as early as November 1992. It quotes the chairman of one such firm as saying '[Early adoption of FRS 3] does not have a major impact on the results of the company for the half year or for the previous year, but it does have the consequence of increasing marginally our earnings per share in both periods as the result of including within ordinary activities certain items previously classified as extraordinary.'

above tests using earnings levels and changes *after* extraordinary items (EAXI).²⁴

When examining earnings levels for the whole sample period, we find that the pattern reported in our main (EBXI) results, i.e. the presence of a discontinuity for earnings and its absence for NDE, is repeated for EAXI. This is may be attributed to the overall effect of XIs being small relative to the larger number of firm-years without XIs. The patterns for the two sub-periods (pre- and post-FRS 3) are also consistent with those reported for EBXI.

For earnings changes, the pattern of results is interesting. Examining $\Delta E(\text{AXI})$ for the whole period, the discontinuity is more equivocal, i.e. while the coefficients (standard differences – not reported but see Table 2 for structure) of the bins below zero are significant for all models tested, those just above zero are not (although consistently approaching significant levels). The pattern for $\Delta \text{NDE}(\text{AXI})$ is similar, i.e. a discontinuity is present, again suggesting that in the pre-FRS 3 period XIs were indeed used for earnings management purposes. Examining the two sub-periods, the pattern for the pre-FRS 3 period is similar to that for earnings levels whilst that for the post-FRS 3 period is as described for the whole period, i.e. again the pre-FRS 3 sub-period effect partially masks the post-FRS 3 effect.

The above results indicate that the use of extraordinary items as an earnings management tool is worthy of further investigation. To provide this, we also examine the distribution of extraordinary (XI) and special items (SI – a post-FRS 3 Datastream defined category capturing items categorised as extraordinary pre-FRS 3) conditional on earnings relative to targets. This enables us to evaluate further whether firms widely used misclassification of XI and SI as a means of achieving earnings targets.

The main prior expectation we have on the relationship between earnings and XI or SI is that large negative earnings would be associated with low average XI or SI and high (low) incidence of negative (positive) XI or SI. This prediction is based on previous evidence that the incidence of negative XI and SI is greater in periods of financial distress or extremely poor performance (Elliott and Shaw, 1988; Hanna, 1999). To the extent that firms transform small deficits into small surpluses by misclassifying XI or SI, we expect small surplus firm-years to have unusually low average XI or SI, unusually high frequency of negative XI or SI, and unusually low frequency of positive XI or SI.

Figure 2 plots average XI and the incidence of negative and positive XI for equal-sized portfolios

of firm-years based on ranked negative and positive earnings relative to targets. This figure relates to the pre-FRS 3 period, defined in this section as all accounting periods ending on or before 30 June 1992, FRS 3 having been issued on 29 October 1992. Figure 3 reports the equivalent results for post-FRS 3 accounting periods, i.e. average SI, and the incidence of negative and positive SI. We define post-FRS 3 in this section as those accounting periods ending on or after 22 June 1993, the date from which mandatory compliance with FRS 3 was required.²⁵ Our earnings levels and changes portfolios comprise 200 observations each, while our pre- and post-FRS 3 earnings surprise portfolios are constructed to have 127 and 118 observations respectively, these being the numbers of exact zero surprises in the samples concerned.

Figure 2 Panel A1 presents a plot of average XI by earnings portfolios. A broadly positive relationship between XI and earnings is clearly observable, indicating that as earnings increase, so too do average XI. Panels A2 and A3 present the plots of the proportion of observations in each portfolio reporting negative and positive XI, respectively. Panel A2 clearly shows that the incidence of negative XI decreases steadily as earnings increase, while Panel A3 shows that the incidence of positive XI is relatively stable over the range of earnings. Examining the region around zero, there is no clear evidence in any of the panels consistent with the use of XI classification to transform small deficits into small surpluses.

Similarly, Panels B1, B2 and B3 present average XI and the incidence of negative and positive XI conditional on earnings change. As before, there is a broadly positive relationship between XI and earnings changes. The incidence of negative XI falls as earnings change increases, but the incidence of positive XI is relatively stable as earnings change varies. This pattern is broadly consistent with the expectation that the incidence of negative XI is associated with poor (or distressed) performance. As with the levels sample, we do not observe around zero earnings changes any clear evidence of variation in XI that suggests the use of XI classification to achieve positive earnings changes. However, it does appear that the smallest negative earnings change portfolio has relatively high incidence of negative XI and low incidence of positive XI. This is consistent with the use of XI classification to minimise earnings decreases.

Panels C1, C2 and C3 present plots of average XI and the incidence of negative and positive XI by earnings surprise portfolio. Extreme negative earnings surprises are associated with extremely low average XI, relatively high incidence of negative XI and relatively low incidence of positive XI, as predicted. Strikingly, with the exception of the extreme negative earnings surprise portfolio, the

²⁴ We would like to thank one of the reviewers for suggesting that we investigate this issue. Note that we do not conduct this test for earnings surprises as the I/B/E/S data upon which that work is based is not amenable to this.

²⁵ I.e. the sample is selected per footnote 23.

zero earnings surprise portfolio has the lowest average XI. Further related evidence is presented in Panels C2 and C3. With no exceptions, the zero surprise portfolio has the highest proportion of negative XI and lowest proportion of positive XI. This is again consistent with ordinary expenses being classified as extraordinary and extraordinary revenues being classified as ordinary so as to facilitate achievement of exact zero earnings surprises.

In Figure 3, we conduct a similar analysis of the use of SI subsequent to implementation of FRS 3. Panels A1, A2 and A3 report average SI and the incidence of negative and positive SI by portfolios based on ranked earnings. As expected, and consistent with the results for the pre-FRS 3 period, firm-years with large losses have relatively low average SI, high incidence of negative SI and low incidence of positive SI. We do not observe that small profit firm-years have unusually many negative SI or unusually few positive SI.

Panels B1, B2 and B3 report similar plots but conditional on earnings changes. As with the plots conditional on earnings levels, we do not observe that small positive earnings changes portfolio have unusually many negative SI or unusually few positive SI. However, to the left of zero, we note that the smallest negative earnings change portfolio appears to have relatively many negative SI and few positive SI. This result suggests the use of SI classification as a means of minimising negative earnings changes.

Average SI and the incidence of negative and positive SI are plotted by earnings surprise portfolio in Panels C1, C2 and C3. These plots indicate that the zero earnings surprise portfolio have unusually few negative and positive SI. The low incidence of positive SI would be consistent with firm classifying positive special revenues as ordinary to manage earnings upwards. However, the low incidence of negative SI is contrary to the classification of ordinary expenses as special to manage earnings upward to meet forecasts exactly. One plausible reason for this occurrence is that firms might also be managing earnings downward to meet forecasts exactly. In this case, the low incidence might reflect the presence of firms classifying special expenses as ordinary to manage earnings downward in order to meet forecasts exactly. However, the plausibility of this argument depends on the conjecture that firms managing earnings upward to meet forecasts misclassify special revenues as ordinary, while firms managing earnings downward to meet forecasts misclassify special expenses as ordinary. We are not aware of theoretical support for this conjecture.

In summary, we find some evidence consistent with the achievement of positive earnings levels, changes and surprises being facilitated by misclassification of XI or SI. However, the picture is com-

plex, e.g. we do observe evidence that exact zero earnings surprises are associated with relatively frequent occurrence of negative XI and infrequent occurrence of positive XI. This is consistent with misclassification of positive and negative XI as a means of managing earnings upward to meet forecasts exactly.

6. Conclusion

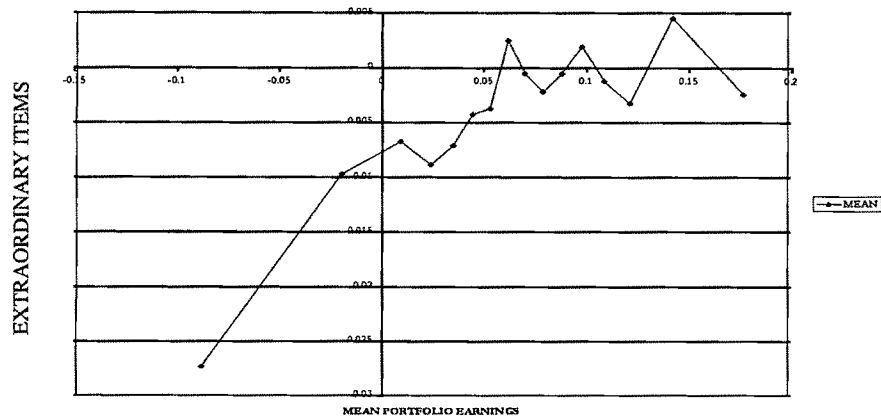
We study a large sample of UK firm-years and document that earnings are distributed discontinuously around basic targets while non-discretionary earnings are not. We report that discretionary accruals have the effect of increasing the frequency of achievement of positive earnings levels, changes and surprises. In particular, discretionary accruals have the effect of increasing the incidence of small positive earnings levels, changes and surprises, and decreasing the incidence of small negative earnings levels. We therefore conclude that discretionary accruals are a significant cause of the discontinuity observed in the distribution of earnings relative to basic targets. In addition, we report evidence consistent with the use of discretionary accruals to reduce the magnitude of large negative and positive earnings changes and surprises.

This evidence confirms that discretionary accruals are used in managing earnings to achieve targets, and validates the use of such accruals as a proxy for earnings management. However, the evidence we report indicates that it is not reasonable to assume that firms invariably seek to increase earnings when using discretionary accruals, an assumption implicit in some of the previous literature. We show that the directional use of discretionary accruals as an earnings management mechanism varies with the relationship between unmanaged earnings and basic earnings targets. The specific manner in which firms use discretionary accruals must be considered when using them to proxy for earnings management.

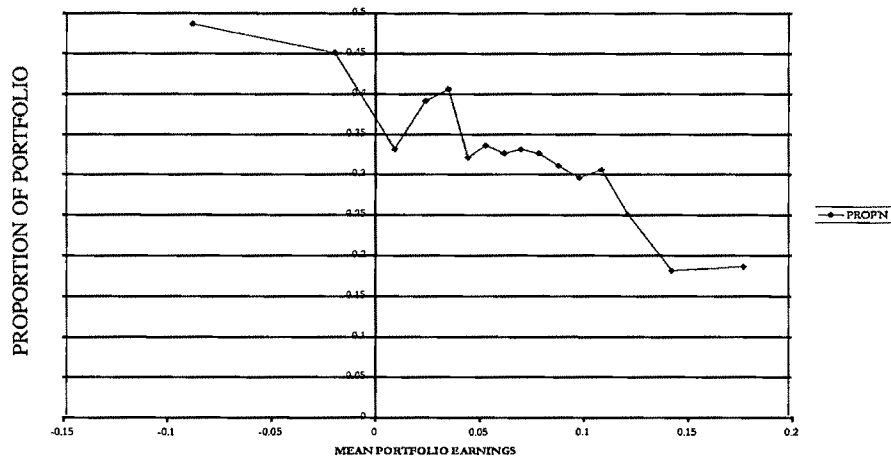
We further report that exact zero earnings surprises are associated with relatively high variance in discretionary accruals. This suggests extensive earnings management to meet forecasts exactly. In addition, we find that exact achievement of forecasts is associated with relatively low average extraordinary items, high incidence of negative extraordinary items and low incidence of positive extraordinary items. This is consistent with misclassification of extraordinary items as a method of managing earnings upward to meet forecasts exactly. In addition, we observe some evidence in the pre-FRS 3 period of misclassification of extraordinary items to facilitate achievement of positive earnings levels or changes. We therefore conclude that since FRS 3 discretionary working capital accruals are prime among methods used by firms to achieve basic earnings targets.

Figure 2
Use of extraordinary items pre-FRS 3
Panel A – Earnings levels portfolios

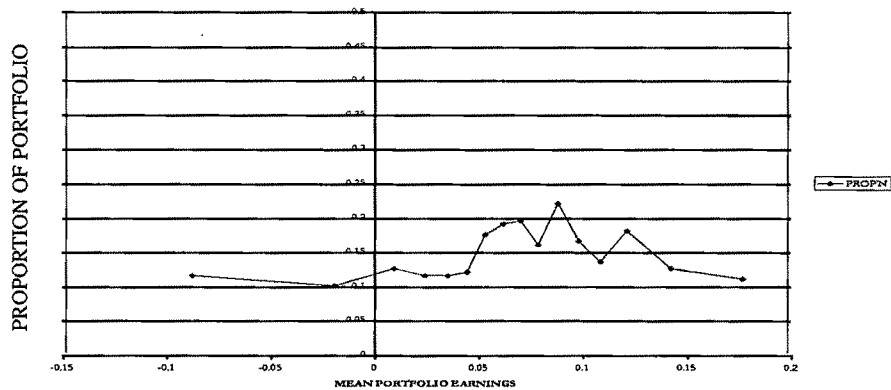
Panel A1 Average extraordinary items



Panel A2 Proportion of observations with negative items



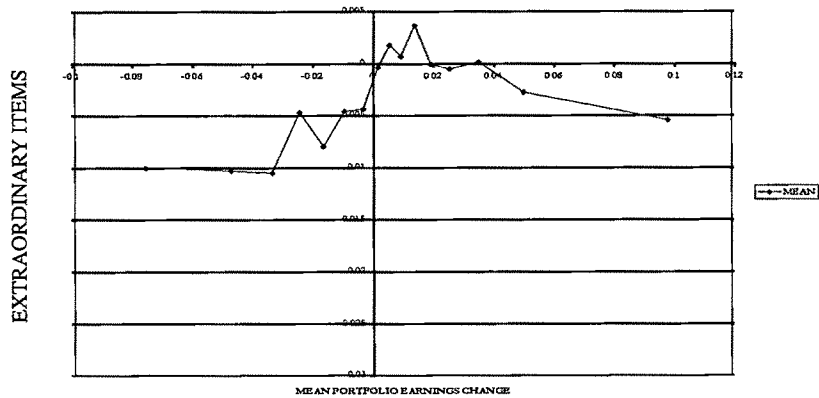
Panel A3 Proportion of observations with positive items



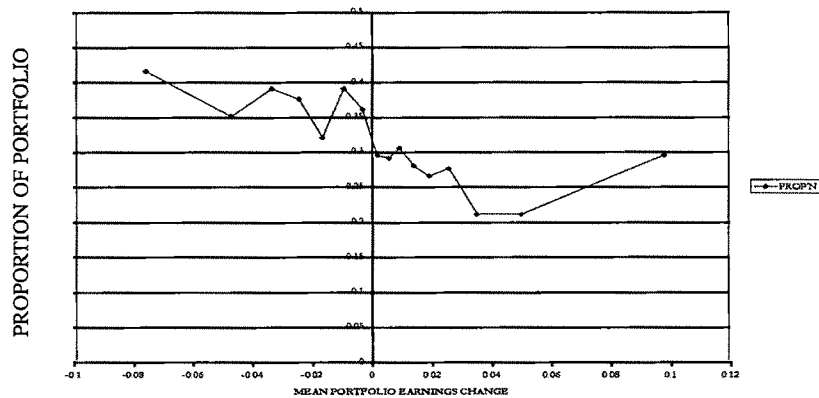
16 portfolios of 200 observations each, based on Earnings before Extraordinary Items

Figure 2
Use of extraordinary items pre-FRS 3
Panel B – Earnings changes portfolios

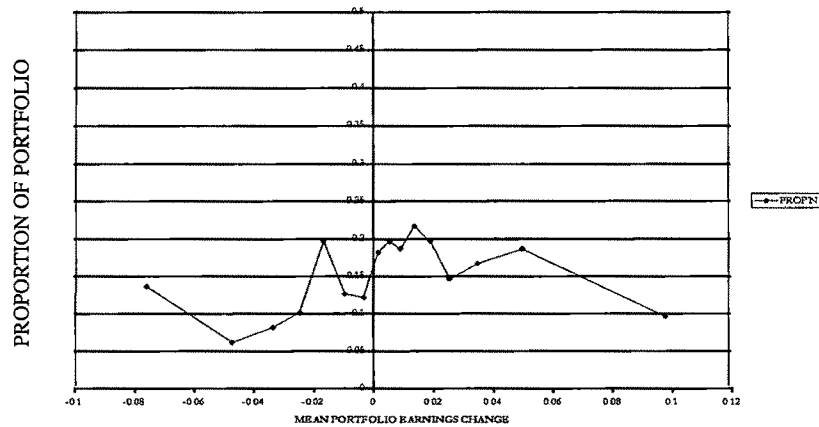
Panel B1 Average extraordinary items



Panel B2 Proportion of observations with negative items



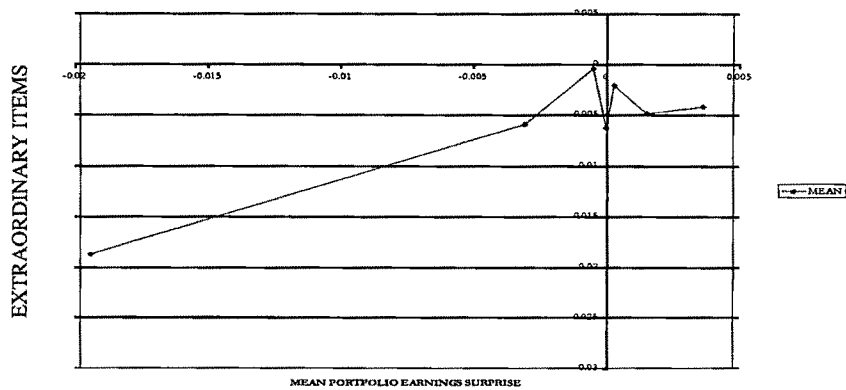
Panel B3 Proportion of observations with positive items



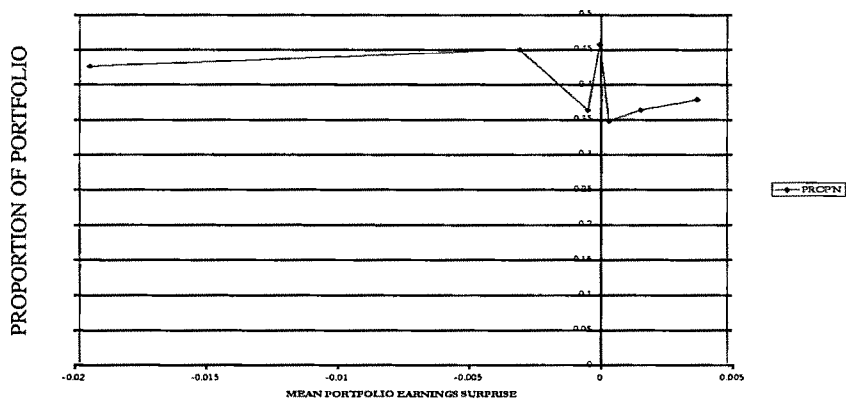
16 portfolios of 200 observations each based on Earnings before Extraordinary Items

Figure 2
Use of extraordinary items pre-FRS 3
Panel C – Earnings surprises portfolios

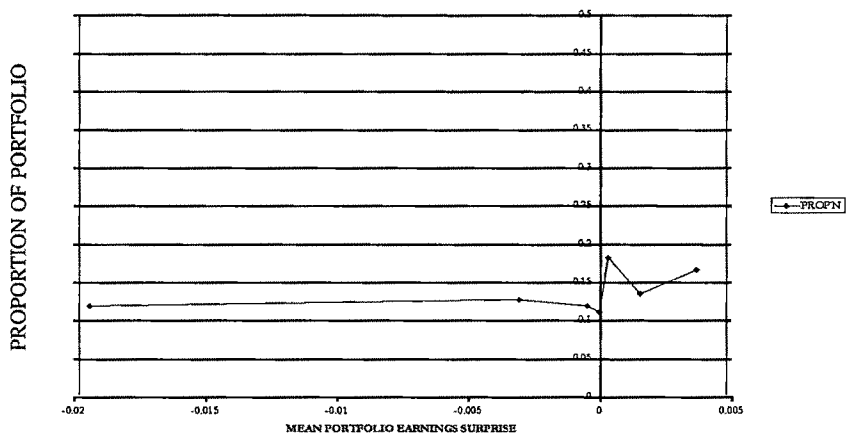
Panel C1 Average extraordinary items



Panel C2 Proportion of observations with negative items



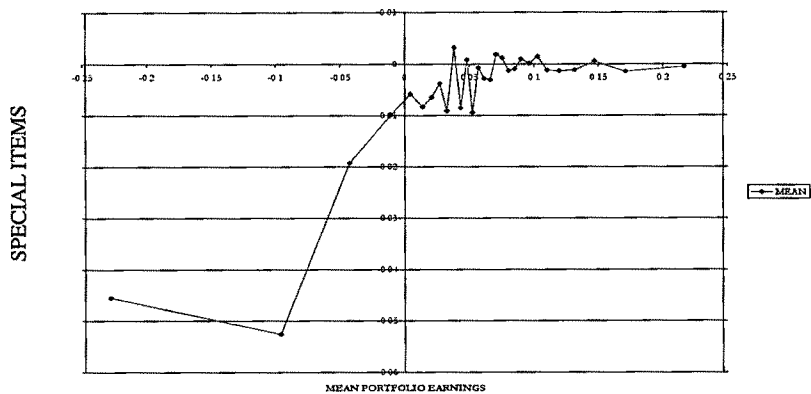
Panel C3 Proportion of observations with positive items



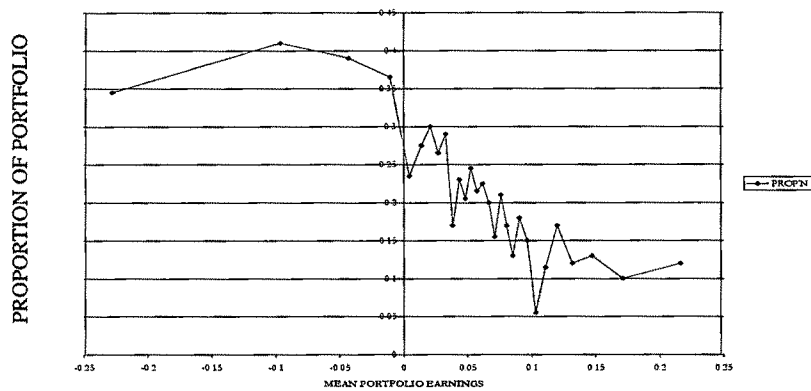
Seven portfolios of 127 observations each based on Earnings before Extraordinary Items

Figure 3
Use of special items post-FRS 3
Panel A – Earnings levels portfolios

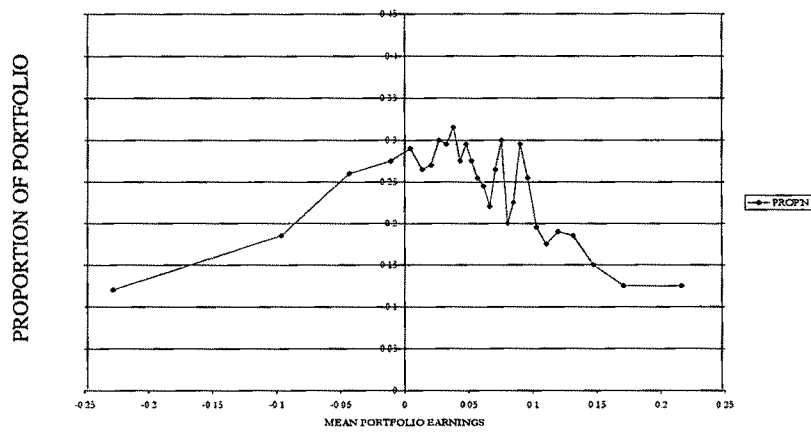
Panel A1 Average special items



Panel A2 Proportion of observations with negative items



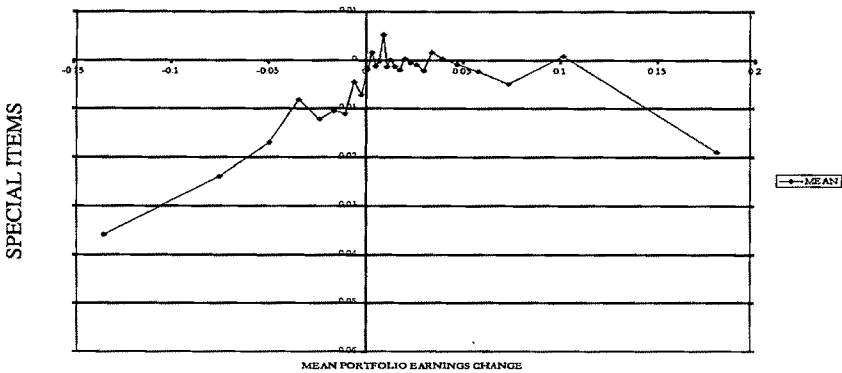
Panel A3 Proportion of observations with positive items



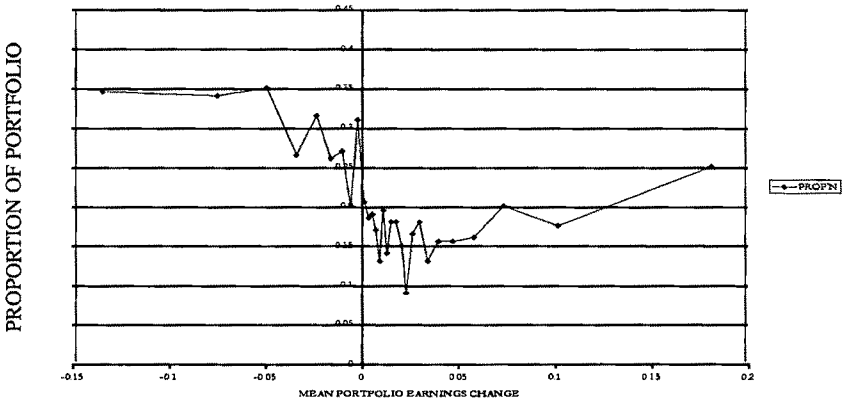
29 portfolios of 200 observations each based on Earnings before Extraordinary Items

Figure 3
Use of special items post-FRS 3
Panel B – Earnings changes portfolios

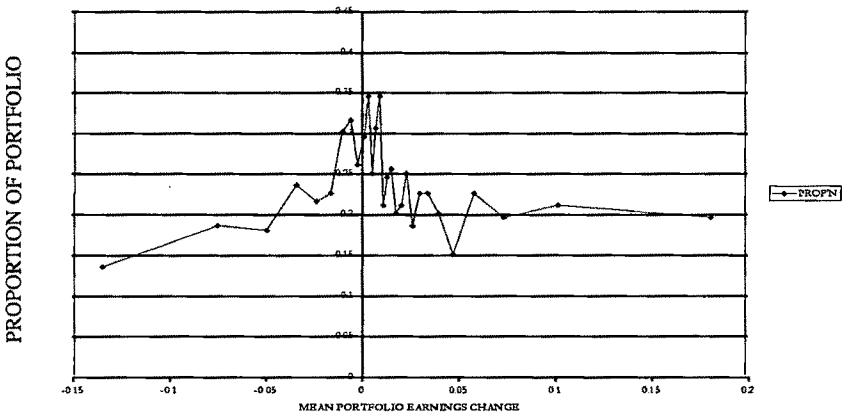
Panel B1 Average special items



Panel B2 Proportion of observations with negative items



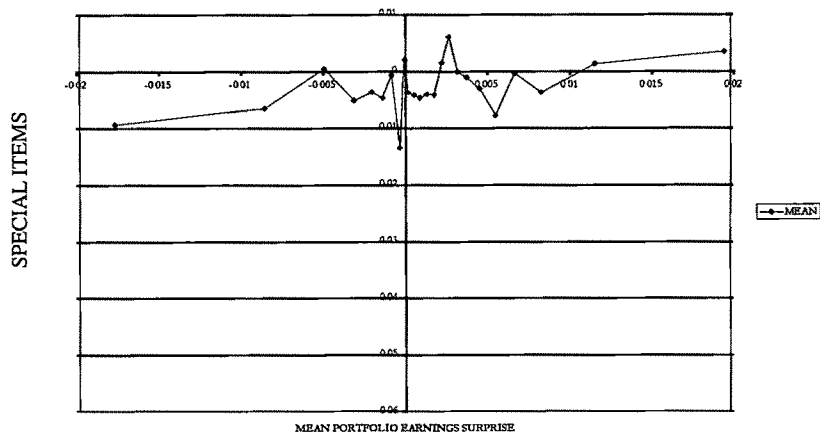
Panel B3 Proportion of observations with positive items



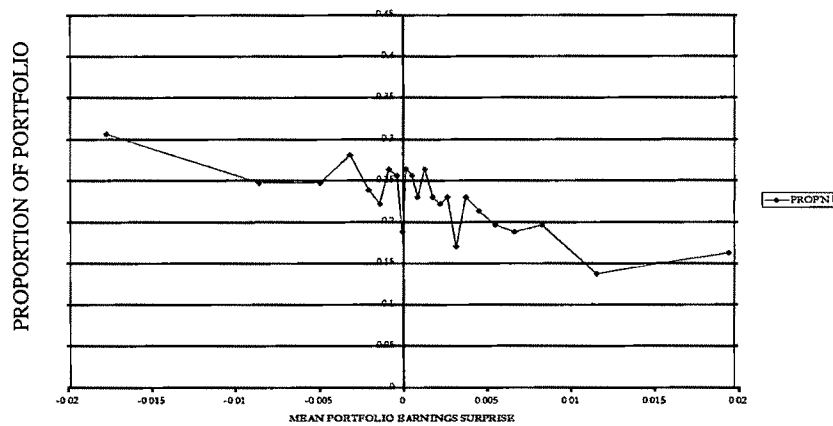
29 portfolios of 200 observations each based on Earnings before Extraordinary Items

Figure 3
Use of special items post-FRS 3
Panel C – Earnings surprises portfolios

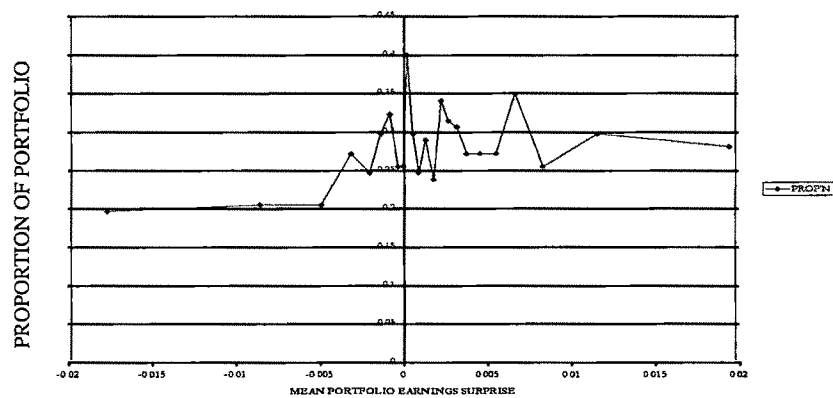
Panel C1 Average special items



Panel C2 Proportion of observations with negative items



Panel C3 Proportion of observations with positive items



24 portfolios of 118 observations each based on Earnings before Extraordinary Items

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Determinants of financial covenants and pricing of debt in private debt contracts: the UK evidence

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Abstract—This paper presents details of financial covenants given by a sample drawn from the largest 200 non-financial quoted firms in the UK in private debt contracts and analyses these data to see whether there are relationships between the nature of the covenants given and firm characteristics. Data were obtained from 72 firms, of which 17 gave no financial covenants. Firm size was found to be the only significant factor influencing whether firms did or did not give covenants as well as the only factor which influenced the margin given on debt. Some types of covenants given were found to be different from those found in previous research. In particular, there is greater use of EBITDA as a base for both interest cover and gearing covenants. This shows the importance of cash flow based lending as opposed to asset based lending for general financing for large firms.

Key words: Debt contracts, debt pricing, financial covenants, costly contracting.

1. Introduction

Long-term committed loan agreements typically contain financial covenants. A financial covenant is an undertaking given by a borrower to its lender to maintain a minimum or maximum level of a financial measure such as gearing or net worth or interest cover. Borrowers may undertake to provide covenants from a variety of motives, e.g. to increase the availability of lending, to reduce the risk to the lender and thereby reduce the cost of borrowing. Lenders similarly may require covenants to reduce the risk of default, to facilitate monitoring and to lend at lower interest rates. The agreed covenants may reflect the borrower characteristics that, from the lender's point of view, have a bearing on the latter's risk exposure.

The giving as well as the receiving of financial covenants entails both costs and benefits to the borrowers and the lenders. The costs to the borrowers include the direct costs of writing the financial covenant contracts and the compliance costs such as maintaining the accounting information system. They also include indirect costs that result from the suboptimal investment and financ-

ing decisions the borrower is constrained to make by the financial covenants. For example, under the constraints of financial covenants a firm may follow an overly conservative investment policy thereby foregoing potentially value-enhancing investment opportunities. The benefits to the borrowers may include increased access to finance and lower borrowing costs.

The costs to the lender include the costs of writing financial covenant contracts, monitoring the borrower's compliance and enforcing the financial covenants in the event of default. The benefits consist of a lending opportunity, reduced risk exposure, better debt management through ongoing monitoring or providing an early warning signal that reduces the cost of default.

Financial covenants are written in the case of both public debt, e.g. bonds, and private bank debt. In the case of the former, the presence of a wide diversity of lenders and investors may lead to a certain degree of covenant standardisation (Iskandar-Datta and Emery, 1994). On the other hand, in private debt the range and type of covenants are negotiated directly between the lender and the borrower. Such private agreements may see a wide range of borrower company-specific covenants due to lower costs of renegotiation than in the case of public debt. They also provide the opportunity to tailor or customise covenants to suit the individual borrower's financial and other characteristics better (Dichev and Skinner, 2002). In contrast to several studies that have examined financial covenants in public debt, there are very few studies that have investigated the determinants of financial covenants in, and their impact on the

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pricing of, private debt. Given the greater diversity of covenants in private debt agreements for the above reasons, a study of financial covenants in private debt may provide more insights into their determinants than one based on public debt.

Much of the research into financial covenants has been based on US data on public debt (Smith and Warner, 1979) or on private debt contracts that are required to be filed, but based upon public precedents (Leftwich, 1983; Dichev and Skinner, 2002). Unlike in the US where researchers have relied on public filings of private loan agreements (Leftwich, 1983; Press and Weintrop, 1990), access to such data is difficult in the UK since companies are not obliged to disclose this information publicly. UK companies regard details of covenants as highly sensitive matters that should be kept confidential. Within the UK, Citron (1992a) has studied bank lending covenants. He has also examined financial covenants in public debt contracts (Citron, 1992b) and finds that many public debt contracts do not include financial covenants (Citron, 1995; Malitz, 1986). However, our knowledge of private debt covenants, their determinants and their impact on debt pricing is very limited. While Day and Taylor (1996b) report an interview-based study of corporate treasurers concerning the motivations and the consequences of financial covenants in private debt contracts, analysis of the determinants of private debt financial covenants and the pricing of that debt, based on objective and publicly available data, is still lacking.

In this study, we provide evidence of financial covenants associated with private debt for a sample of the largest UK corporate borrowers generated from a survey of the largest 200 non-financial UK firms in 1999. We examine whether the incidence, type and frequency of financial covenants in these private debt contracts are determined by borrower characteristics. We also examine whether borrower characteristics influence the cost of private debt that the sample borrower is contracted to pay.

For a sample of 55 covenanters and 17 non-covenanters, we find that covenanters are more healthy companies with a lower bankruptcy risk but they exhibit a higher level of systematic stock return risk. Neither difference is, however, significant. Larger firms are significantly less likely to offer financial covenants. There is little difference between covenanters and non-covenanters in terms of their profitability and cash flow in the year prior to the signing of the financial covenants. Covenanters, however, pay out a significantly smaller proportion of their earnings as dividends, perhaps reflecting the greater liquidity constraints on these firms. In a multivariate logistic model, however, firm size is the only determinant of the

decision to offer covenants with larger firms being able to avoid doing so. Borrower size also has a significant impact by lowering the price of debt. No other variable is able to explain the pricing.

This reliance on a single characteristic to the neglect of other indicators that have traditionally and empirically been associated with default risk, debt service capacity and risk premium raises intriguing issues about the models used by lenders to assess default risk and price their lending. We speculate on the reasons for lenders not to fine-tune the covenant requirements and margin on lending to borrower characteristics.

Our paper also sheds light on the way types of financial covenants given in private debt have changed in response to changes in accounting disclosure rules in the UK and the increasing interest in cash flow-based covenants. Our study

- fills a significant gap in our knowledge of financial covenants in private debt;
- empirically examines the characteristics of covenanters and non-covenanters in private debt contracts in the UK;
- provides insights into the borrower characteristics that determine the incidence, type and range of financial covenants given private debt contracts; and
- provides evidence on whether borrower characteristics influence the pricing of private debt contracts.

The paper is organised as follows. In Section 2 we review the literature and deduce some testable implications of the costly contracting and agency models for financial covenants, especially in private debt contracts. Section 3 describes how survey data for our analysis were generated. We also set out the methodology employed in the study. In Section 4 we present and discuss the empirical results and their implications for both theory and practice concerning debt contracts and financial covenants. The final section provides a summary and conclusions.

2. Review of the literature

2.1. *The purpose of financial covenants – costly contracting hypothesis*

Smith and Warner (1979) argue that the principal purpose of loan covenants is to manage the conflict between lenders and borrowers arising from the information asymmetry between them. Financial covenants enable lenders to control the risk that they accept for a pre-determined return. They may serve to limit a borrower's flexibility in future decision-making (Smith and Warner, 1979; Berlin and Mester, 1992 cited in Mather, 1999b). To the extent that they restrict the borrower from

making profitable investments, they may have a detrimental effect on firm value (Myers, 1977). Thus, entering into financial covenants may impose significant opportunity costs on borrowers.

Under the costly contracting hypothesis both the borrower and the lender enter into an optimal set of financial covenants that maximise their return-to-risk tradeoff. Since financial covenant contracting is costly, the benefits from entering into such contracts should, in equilibrium, at least equal the costs. Smith and Warner (1979) argue that since covenants are a persistent phenomenon, these provisions should be deemed efficient from the standpoint of the firm's owners. The costly contracting model implies that the type and range of financial covenants that a borrower has to provide to the lender are a matter of negotiation between the two.

The negotiation will be subject to a number of parameters that define the riskiness of the loan, need for a costly contract, and cost of formulating and enforcing the contract. These in turn are likely to depend on the borrower characteristics that will influence the lender's perception of the credit risk. Moreover, the lenders may calibrate the terms of lending including the type and range of financial covenants to suit the borrower's perceived risk.¹ If under the costly contracting hypothesis, financial covenants are a risk management tool for the lenders and an efficient mechanism for the borrower to minimise its borrowing costs, we can expect to find an association between the determinants of financial covenants and the pricing of debt.

2.2. The purpose of financial covenants – the agency perspective

A different, but related, perspective on financial covenants derives from the agency model of the firm. Managers are the lender's agents in the disposition of the borrowed funds (Jensen and Meckling, 1976). Thus lending entails agency monitoring. If the agency costs are too high, the managers run the risk of either not being able to borrow at all or borrowing at a high cost. To avoid or mitigate that risk, managers undertake to provide financial covenants that may reduce the agency monitoring cost to the lender. The costs borne by the borrower are thus in the nature of bonding costs. Again, borrower managers will optimise the use of financial covenants by trading off

their benefits to costs.

Under the agency model, the type and range of financial covenants demanded by the lender and proffered by the borrower depend on the scope for agency conflict between the two. This in turn depends on the borrower characteristics such as its free cash flow, its prior debt service record or whether the debt is secured. Lenders use financial covenants as instruments to manage and reduce the agency conflict. To the extent financial covenants mitigate agency costs to the lenders, the costs to the borrowers may fall.

2.3. Review of prior empirical evidence on financial covenants

The borrower's perspective

In order for financial covenants to serve a borrower's economic purpose, the conceding of financial covenants should be reflected in lower loan pricing. The tighter the covenants the lower still should be the loan pricing. In particular Smith and Warner (1979) suggest there should be an optimal set of covenants in terms of number, type of covenant and tightness of such covenants that would maximise firm value. Several studies provide empirical evidence on tightness of covenants and loan pricing from both borrower's and lender's perspectives (see below).

Malitz (1986) similarly examines the role of bond covenants in agency conflicts and argues that 'for large firms, where information is readily available and reputation is both established and reviewed often, the cost of explicit covenants exceeds any possible benefits.' Citron (1992b) finds evidence that larger public companies are able to avoid covenants and attributes this to 'large companies having less need to use covenants to prevent lenders price-protecting themselves'.

The lender's perspective

Covenants represent a means of controlling expected losses to the lender from the borrower's default. Bradley (2001), in commenting on the proposed changes to bank capital adequacy rules under Basel II, suggests 'there will be much more focus on credit quality overall and borrowers should be prepared for lenders to push harder for covenants that protect credit quality.'

Day and Taylor (1996a) observe a wider range of purposes that lenders seek to serve through covenants. Covenants in loans provide lenders with one or more of the following: an early warning signal or a renegotiation lever; control or comfort; the ability to restrict management discretion in financing and investment decisions; and a means to call the loan.

Day and Taylor observe a clear bias towards the first purpose. In particular the bankers cited in their study were clear that covenants 'crystallise

¹ Myers (1977) observes that the optimal situation would require no covenants and 'voluntary forbearance would be the simplest and best solution...[b]ut a reputation for honesty is acquired mainly by performance'. Mather (1999b) finds that the tightness of covenants is indeed linked to management reputation for debt servicing. Therefore, some well-established firms would not need to bear the costs of (tight) covenants and that banks would lend without covenants for the same return.

terms of the agreement at the outset' and also that 'covenants...ensure that the lender's position is no worse than the worst-case scenario.' The purpose of covenants is not only to manage the agency conflict, but also to limit the level of risk that the lending banker is willing to accept. Thus, although the costs of monitoring the covenants may be high, the presumed economic benefit is lower loss to lenders and hence lower cost to the borrower (see Dichev and Skinner, 2002 for similar arguments).

There is also evidence that lenders seek covenants as part of an overall credit – pricing equation. Iskandar-Datta and Emery (1994), in their study of indenture provisions in public bond contracts, find that restrictiveness of covenants significantly affects the rating of a new debt issue and thus, via bond pricing, the interest rate. McDaniel (1986) reports an instance of a rating agency being involved in determining the inclusion of covenants which could point to some customisation of covenants. Metzgen (2000) notes while discussing current market terms that, 'whereas some investors had simply relied on a corporate's unsecured credit rating or even its reputation, they are now demanding increased credit protection through covenants.' This argument also points to the inter-relationship among reputation, tightness of covenants and pricing.

Are covenants customised to serve borrower and lender purposes?

While both the costly contracting hypothesis and the agency model indicate that financial covenants are likely to be customised to the idiosyncratic characteristics of each borrower, whether they are indeed customised in actual loan agreements needs to be empirically established. According to Day and Taylor (1997), many UK treasurers do not believe that the financial covenants negotiated are effective from the lenders' point of view: '[T]oo often the covenants used by lenders were not sufficiently relevant to the fundamentals of the corporate borrowers' businesses.' This may be a perception on the part of the borrowers or it may be that, in the lenders' judgment, the incremental costs of customising covenants do not offer economic benefits that match or exceed those costs. Day and Taylor conclude that lenders' behaviour is driven by market norms and individual bank practice and so there will be a lag behind innovative practice in setting financial covenants.

In practice, the actual covenants are part of a process of negotiation, presumably based on market power and the skill of the negotiators (Day and Taylor, 1995). In focusing on the largest companies in our survey, we may presume that these companies employ the most skilled negotiators in this area. Thus we may assume that the observed pattern of covenants in our sample reflects the best set of covenants that could be achieved for the borrowers involved.

Existence and variety of financial covenants in private loan contracts

Previous research into financial covenants in private loan agreements has been limited. Researchers have little information access to the types of covenants in loan agreements that do not have to be disclosed publicly. Much of the literature on financial covenants has been based on public bond covenants in the United States (e.g. Smith and Warner, 1979). In the UK bond market, Citron (1995) finds that 30% of the 108 public bond agreements he examined contained accounting-based covenants, the majority of which relate to gearing. Among a few studies that have examined private loan agreements are Mohrman (1996) in the US, Citron (1992a) and Day and Taylor (1996a) in the UK and Mather (1999b) and Ramsay and Sidhu (1998) in Australia.

Our study focuses on private debt agreements in bank loans. Bank lending, as opposed to bonds, is reported to account for 89% of European lending as opposed to US practice where bonds represent 80% of corporate borrowing (*Treasury Today*, 2000). Therefore, in contrast to the predominantly bond-focused studies in the US, it is appropriate in the UK context to focus on bank covenants rather than bonds.

An important characteristic of the bond market is the provision of debt by many lenders without the ability easily to renegotiate loan terms. However, the private banking market affords an opportunity for ongoing dialogue with borrowers and the opportunity to revise terms in accordance with changing scenarios.² It is therefore logical that there should be debt contracts with specifically tailored covenants and renegotiation options (Mather, 1999b). Several studies establish that private loan covenants are more varied than those in bond agreements (Gopalkrishnan and Prakash, 1995; Mather, 1999a; Mohrman, 1996).

Do these varied loan covenants represent appropriate restrictions on borrower's investment and financing decisions or are they merely costless concessions, because they are so loose, that borrowers offer in order to enhance the comfort level to lending banks? In the latter case, the costly contracting hypothesis would not provide a complete rationale for the levels at which loan covenants are set or it might be that market participants (bankers

² Companies borrow either (i) from financial institutions in the money markets ('loans') either from banks individually or via groups of banks in club loans or by syndication or (ii) from a wide range of institutional investors in the capital markets ('bonds') (Cates, 1999). Short debt maturity also provides renegotiation options to alleviate the information asymmetry between lenders and borrowers and so public debt and bank lending provides different mechanisms for alleviating moral hazard from borrowers (Diamond, 1991a, 1991b)

and corporate financial managers) do not consider the setting of loan covenants in terms of strict economic trade-off as suggested by Day and Taylor (1996a). Equally, covenants might provide benefits of flexibility to borrowers in that they can retain the original terms if their credit deteriorates, provided the borrower does not breach the covenants. Therefore, our research has also gathered some views from companies on how effective they perceive the covenants to be in restricting their decisions. This is particularly appropriate when dealing with the largest companies about which information is widely available and also which are also more likely to have sophisticated financial managers able to negotiate effectively.

As Day and Taylor (1998) observe, in practice a certain type of debt contract may be treated as the norm without detailed consideration of whether the particular set of covenants has an economic basis. For example, much of the US-based literature talks of covenants that restrict dividend payments (Smith and Warner, 1979), yet UK and Australian literature do not find this restriction. Do private lenders choose standardised or 'boilerplate' covenants (Leftwich, 1983, Citron, 1992b) as occurs in the bond markets (Kahan and Klausner, 1997) or are they able to tailor covenants to each situation? Some of the previous studies have failed to address this question by concentrating upon standard documents such as the American Bar Foundation *Commentaries on Indentures* (Smith and Warner, 1979).

There have been three significant studies of private loan agreements in the UK. Citron (1992b), in his survey of 33 lending bankers, studies 'typical' (standardised lawyer's) loan agreements, focusing on the covenants that bankers would like to use rather than the covenants actually used by individual borrowers. Citron (1992a) in a separate study examines 25 actual loan contracts and 13 contract templates but focuses on accounting definitions rather than the relationship between covenants and individual borrower characteristics. Furthermore, we learn very little about the borrowers in these actual loan agreements.³

The widest ranging study of financial covenants in private loan agreements to date is by Day and Taylor (1996b) who interviewed 44 UK corporate treasurers. They report that the three most common covenants relate to balance-sheet gearing, interest cover and minimum tangible net worth. Balance-sheet gearing was the most common (39 responses). The occurrence of these forms of covenant confirms Citron's (1992a) earlier research into bank documents. Mather (1999a), from

interviews with bankers in Australia, establishes that the minimum interest cover and maximum debt or gearing ratio are the most frequently used covenants. Day and Taylor (1996b) also provide limited evidence of large companies being able to avoid financial covenants in private loan agreements completely. In their survey of 44 companies only two companies (both in the largest 20 by market capitalisation) did not give covenants.

None of these papers looks in detail at the tightness of the covenants or the nature of the covenants by type of borrower. Indeed, Day and Taylor (1997) state that 'relatively little is known about the variation in...the value of financial covenants with factors such as the borrower's industry, size...'. Citron (1992b) also suggests that his research could be 'extended by examining whether the ratios used...vary with the industry sector of the borrower.'

There is conflicting evidence on the existence of covenants relating to cash flow, despite their attraction to lenders whose concern is the availability of cash to repay loans. Day and Taylor (1996b) note their virtual absence, whereas Mather (1999a) identifies some awareness of cash flow covenants in his research of bankers in Australia. Dichev and Skinner (2002) also identify a range of cash flow covenants, including debt to cash flow as the most common in the specialist area of management buy-outs and buy-ins. However, Citron et al. (1997) find that covenants involving cash flows and dividend restrictions are almost universal.

This review of empirical studies suggests that, in private loan agreements, lenders still tend to use common covenants that are not significantly customised to the borrower profile in terms of industry, size, or cash flow. In this paper we provide evidence on whether this conclusion is still relevant to more recent private loan agreements in the UK than those analysed by Citron and Day and Taylor.

2.4. Hypotheses tested

From our theoretical and empirical literature review, we derive the following null hypotheses:

- H1:** Firm specific characteristics of the borrowers are irrelevant to the decision of borrowers to offer financial covenants;
- H2:** The type of financial covenants given has no influence upon the pricing of private debt; and
- H3:** Pricing of private debt is independent of borrower characteristics.

Under the agency model, the alternative hypothesis to H1 is that firms with characteristics that reduce the agency conflict between managers and lenders will not offer financial covenants. Under

³ Presumably because the loan agreement documents were obtained from lenders rather than borrowers and that the lenders would have been obliged to maintain confidentiality.

Table 1
Distribution by number and type of covenants given by each sample company

Number of covenants given	Responses	Interest cover	Traditional covenants							New covenants		
			Debt: tangible net worth	Minimum net worth	Limit on secured borrowings	Minimum PBT	Limit on subsidiary borrowings	Minimum size of group assets	Interest, depreciation and amortisation cover	Debt: EBITDA	Minimum cash position	Debt: market capitalisation
0	17											
1	15	7	3						3	2		
2	23	13	14	4	3		2		2	7		1
3	12	10	8	10	2		3		1	2		
4	4	3	2	4	1		2	1	1	2		
5	0											
6	1	1	1	1	1	1					1	
Total	72	34	28	19	7	1	7	1	7	13	1	1

the costly contracting model, the alternative hypothesis to H2 is that more frequent use of covenants or more stringent covenants will lead to lower cost of debt. The alternative to H3 is that firm characteristics that reduce the chances of default and loan loss to the lender will reduce the cost of debt. In the next section we describe the data and methodology to test these hypotheses.

3. Data and methodology

3.1. Survey of companies and data on financial covenants

To identify the covenants in current use in loan agreements we carried out a survey of large corporate borrowers in the UK during 1999. The focus of this survey is on borrowers rather than lenders. Accordingly, we sent out letters, seeking details of the financial covenants in loan agreements, to the finance director or senior member of the Treasury department of the largest 200 non-financial UK companies, defined by market capitalisation at the end of April 1999. An initial mailing was sent to members of the Association of Corporate Treasurers, which accounted for 70% of the 200 companies – data were obtained from some 50% of this group. In all other instances, a letter with

identical terms to the one sent to the first group was sent to the finance director of the company concerned – however, the response rate here was only a little over 30%, and within this response rate nearly half refused to provide the required information. The higher response rate from the first group may be attributed to three factors:

- The direct interest of corporate treasurers in the results of the research;
- Many respondents knew, or knew of, one of the researchers and were more prepared to respond; and
- The familiar reluctance of finance directors to respond to 'cold' research requests.

It may be that responding corporate treasurers are more likely to be involved in negotiating loan covenants and so the responses will be well informed. However, there is no ground for any presumption of bias in our sample arising from the responses from treasurers as opposed to the other respondents, given that we are looking for informed respondents. In the few cases in which the response has come from the finance director, six were from firms with no debt and in the responses from borrowers almost always came from another

Table 2
Borrower characteristics as explanatory variable – definitions

<i>Variables</i>	<i>Definitions</i>
Size	
Sales	Annual turnover
Profitability	
EBIT/TA	Earnings before tax and interest divided by total assets
EBITDA/TA	Earnings before tax, interest, depreciation, and amortisation divided by total assets
Risk	
Beta	The sensitivity of the borrower share price to market wide share price movements
Z score	Weighted average of financial ratios that measures potential bankruptcy risk
Liquidity	
Dividend payout (DPR)	Equity dividend divided by net income
Free cash flow (FCF)	EBITDA minus capital expenditure and working capital movements divided by total assets
Gearing	
Total liabilities/total assets	Total liabilities including current liabilities/total assets

member of the finance department.

Financial companies were excluded due to their different capital structures compared with industrial companies and, therefore, potentially different ranges and types of covenants.⁴ Copies of the actual pages of the loan agreements were requested, including definitions, interest margin on the loans and the terms of the agreement. Many respondents did not provide the pages of the loan agreement, but did summarise the information requested in the form of a letter or by providing copies of the internal documents used to monitor compliance with loan agreements. Given the broad understanding of the terms involved and the sophistication of the respondents, information provided in letters has been considered on the same basis as actual agreements. In two instances, information was obtained verbally from the head of the responding Treasury department and noted by one of the authors.

Replies were received from 106 companies (53%), of which 24 indicated that they did not wish to participate, some because they had entered into confidentiality undertakings, others because they did not respond to surveys on policy or resource grounds. This left 82 usable responses (41%). Of these, 10 companies stated that they had no debt, leaving an effective sample of 72 borrowing companies.

Table 1 indicates the number of financial covenants given by the respondents who borrowed and the type of covenants given. A large minority

of borrowing firms, 17 (24%), gave no covenants. More than half, 38 (53%) gave one or two covenants. The number of firms giving four or more covenants is very small, only 5 (7% of the sample). The sample indicates that large UK borrowers make parsimonious use of covenants.

3.2. Borrower characteristics

The explanatory variables are firm specific characteristics reflecting the need for, and scope, of lender monitoring of the borrowers through the instrument of covenants:

- borrower size as a measure of both the borrower resources to service debt and its bargaining power to negotiate, whether to sign financial covenants and what types of financial covenants to sign;
- prior profitability of the borrower, a measure of the borrower's ability to service debt;
- its liquidity, a measure of solvency of the borrower;
- its prior debt commitments, a measure of the risk to lender;
- its risk profile, a measure of risk to lender;
- the industry to which the borrower belongs.

Table 2 provides definitions of the accounting and stock market based proxies for firm characteristics. Financial data on each borrower's characteristics such as turnover, total debt and market capitalisation were also collected from the computerised databases, Company Analysis, FAME and Thomson Research and London Business School's Risk Measurement Service (RMS).

⁴ Financial companies may be subject to prudential regulation. This may reduce the default risk to lenders and they may rely less on financial covenants or on a narrower range of financial covenants. Financial covenants may also be less tight than in the case of non-financial borrowers.

Beta is the systematic risk of the firm's equity shares and is taken from the London Business School Risk Measurement Service (RMS) as at 1 April 1999. The balance sheet and income statement variables are calculated from the last accounting period ending with the most recent annual report prior to the survey in April 1999. We regard dividend payout as a liquidity measure since a low payout allows the borrowing firms to retain more of their operating cash flows to finance their operations and investments.

The Z score is a measure of potential bankruptcy risk. Altman (1968) popularised the Z score as a measure of a firm's bankruptcy likelihood. In the UK, a popular Z score model used by banks and industrial firms is developed by Taffler (1983, 1984). Firms with a negative Z score are classified as potential failures, as their financial profiles resemble those of previously bankrupt firms. The model, developed using linear discriminant analysis techniques, takes the following form:

$$Z = c_0 + c_1X_1 + c_2X_2 + c_3X_3 + c_4X_4$$

where $X_1...X_4$ denote the financial ratios, and $c_1...c_4$ the coefficients that are proprietary. There are two versions. The first is used to analyse listed manufacturing and construction companies and has component ratios (with the Mosteller-Wallace percentage contribution measure in brackets): profit before tax/current liabilities (53%), current assets/total liabilities (13%), current liabilities/total assets (18%) and no-credit interval (16%).⁵ The second variant is used to rate listed retail enterprises and has ratios: cash flow/total liabilities (34%), debt/quick assets (10%), current liabilities/total assets (44%) and no-credit interval (12%). In this paper, we employ the Z scores developed by Taffler to define distress.⁶ The sample size is reduced from 72 to 66 by the non-availability of data on some of these variables such as BETA and Z score.

We also analyse the industry affiliation of a borrower as a relevant explanatory variable since industry related risk may influence private debt providers to demand financial covenants or the type of financial covenants they prefer. Moreover, industry practice may also have a similar impact (Citron, 1992b and Day and Taylor, 1997).

⁵ No credit interval is the ratio of excess of quick assets over current liabilities to the projected daily operating expenditure (see Taffler, 1983 for elaboration of this definition).

⁶ Taffler (1995) tracks the performance of this model from its development. Overall, it has had better than 98% success rate in classifying subsequently bankrupt companies as potentially insolvent ($z < 0$) based on their last accounts prior to failure, and exhibits true *ex ante* predictive ability in statistical terms. We thank Professor Taffler and Dr Vineet Agarawal for supplying us with the z scores for our sample.

3.3. Methodology

The survey responses received were analysed by type of covenant in use (e.g. debt/net worth), the level of the covenant was noted and the combinations were analysed. We examine the sample distribution of the covenants in terms of types of covenants and the levels of covenants for which we have numerical data. We carry out, first, a univariate analysis of the differences in borrower characteristics between covenanters i.e. borrower firms that give covenants and non-covenanters i.e. borrowers that do not give covenants.

Second, we perform a multivariate logistic regression with the giving or not giving of financial covenants as the dichotomous dependent variable and the borrower characteristics as the discriminating variables. This model allows us to estimate the probability of a borrower giving any covenant conditional upon its characteristic. This model allows us to test hypothesis H1 above.

Third, we test for differences in the pricing of debt among borrowers offering different types of covenants. Price is the interest rate payable to the lender and is measured by the margin over the London Inter Bank Offered Rate or LIBOR. This allows testing of hypothesis H2 above. Finally, we run a multiple regression to test our hypothesis H3 with this margin for the subsample of companies in the survey for which we have the margin data on financial covenants as dependent variable. The explanatory variables are bidder characteristics as well as the type of financial covenants given.

4. Results

4.1. Types of financial covenants

To explore whether covenants have changed since prior research, in particular, the use of covenants relating to cash flow and to revised accounting treatment of goodwill we examine the types of covenants in use by dividing the observed covenants into Traditional and New covenants. Table 1 analyses the particular financial covenants given and demonstrates the continuing prevalence of covenants relating to gearing, interest cover and minimum tangible net worth.

There are covenants relating to cash flow, but they do not refer to the cash flow statement under Financial Reporting Standard (FRS) 1 of the UK Accounting Standards Board (ASB, 1996). Three new covenants are identified:

(i) a covenant limiting the debt to a multiple of earnings before interest, tax, depreciation and amortisation ('EBITDA') is applied in 13 companies. The limits set fall in a range of 2.5 to 4.5 times EBITDA. This covenant may be regarded as a proxy for cash flow to provide capacity for debt repayment before fresh capital expenditure and is not based on asset cover measures derived from balance sheet values. One example of the definition of

earnings specifically excludes extraordinary and exceptional items ('as defined in FRS 3') and adds back amortisation of goodwill or other intangible assets 'whether pursuant to Urgent Issues Task Force⁷ (UITF) Report 3 or FRS 10 or otherwise'. Thus the attempt is to arrive at normalised cash flow before working capital movements, payment of taxation or net capital expenditure.

While this does not take account of free cash flow from an economic point of view (Leftwich, 1983) it does represent a considerable change in practice. This financial covenant would appear to be current as one treasurer who was negotiating new debt during 1999 cited this covenant as one that many lenders were seeking. He resisted this covenant due to definition problems, especially those relating to calculating relevant earnings for businesses acquired mid-year which were funded by debt.⁸ All of the instances of this covenant within the sample were included in debt contracts signed between 1997 and 1999. Another treasurer using this form of debt limit said: 'We have stopped using gearing as a covenant, viewing it as an unhelpful, meaningless measure.'

Interestingly, Debt/EBITDA, forming the basis of this new covenant, was identified by Beaver (1966) as the single best predictor of corporate bankruptcy. Thus, the covenant seems to be supported by empirical evidence of its efficacy.⁹

(ii) A variant on interest cover, but measuring the ratio of interest cost to earnings before interest and depreciation and amortisation is conceded by seven companies – again, this is a measure excluding non-cash items charged in the profit and loss account. Five of the seven instances of this covenant are set at a minimum multiple of three times EBITDA to interest cost.¹⁰ This shows an approach based more on cash flow than on accounting profit.

(iii) There was a single instance of a covenant limiting the level of debt to a proportion of market capitalisation. This covenant is set at 50% of, in effect, 75% of the market capitalisation of the company.¹¹ The treasurer of this borrower explained that the assets of this business were largely intangible with considerable goodwill write-off. Therefore a traditional gearing covenant was inappropriate. The treasurer also expected to replace this covenant with a traditional covenant now that 'accounting changes make goodwill written-off more visible and easier to add back'. This borrower also conceded a traditional interest cover covenant.

(iv) One company alone had given a covenant relating explicitly to a minimum cash position. A former finance director of this company explained that this company had approached financial distress and therefore this instance, together with the specific characteristics of the company's business,

was designed for the specific situation. Cash, in this instance, was defined by reference to the actual cash balance at any given time. This company also provided the largest number of covenants, six, which the former finance director again explained as a desire to obtain financing by providing 'whatever reasonable covenants the banks wanted'.

It seems that UK loan agreements are still predominantly based on traditional, accrual-based accounting covenants although there is some recognition of cash flow measures. There is some indication that borrower's specific financial position influences the type and number of covenants.

4.2. The level at which covenants are set

Given the frequency of the gearing covenant (defined as debt to shareholders funds) and the interest covenant, we are able to examine the levels at which they are set. Chart 1 sets out the levels at which interest cover covenants are set, typically in the range of two to three times:

Chart 2 sets out the levels at which gearing covenants are set, frequently in excess of 100%

Certainly, for UK quoted borrowers, the gearing covenant replicates a limitation on the level of borrowings typically included in the Articles of Association (one company in the sample actually took the precise definitions used in its Articles, but agreed the bank covenant at a lower level).

4.3 Non-covenanters

To explore the question of whether large companies are able to avoid giving financial covenants altogether, we examine the number and nature of companies that do not give financial covenants. Of the companies with debt, 17 gave no covenants. The size rank distribution of the covenanters and non-covenanters, among the 200 largest UK companies that we sample from is as follows:

Size rank	Covenanters (%)	Non-covenanters (%)
1–50	12 (22)	10 (59)
51–100	20 (36)	5 (29)
101–150	13 (24)	2 (21)
150–200	10 (18)	0 (0)
Total	55	17

⁷ The Urgent Issues Task Force of the UK Accounting Standards Board issues consensus accounting treatments to be adopted where unsatisfactory or conflicting interpretations of standards or the UK companies act have developed. Compliance with UITF abstracts is necessary in accounts that claim to give a true and fair view.

⁸ This definition of Debt/EBITDA included all debt but only part of the post-acquisition earnings.

⁹ We thank one of the anonymous referees for drawing our attention to this empirical evidence.

¹⁰ The others were at 3.5 and 4.5 times

¹¹ The 75% was explained by the treasurer of this company as a way of allowing for share price volatility.

Chart 1
The frequency of levels of interest cover covenants (PBIT/ interest cost)

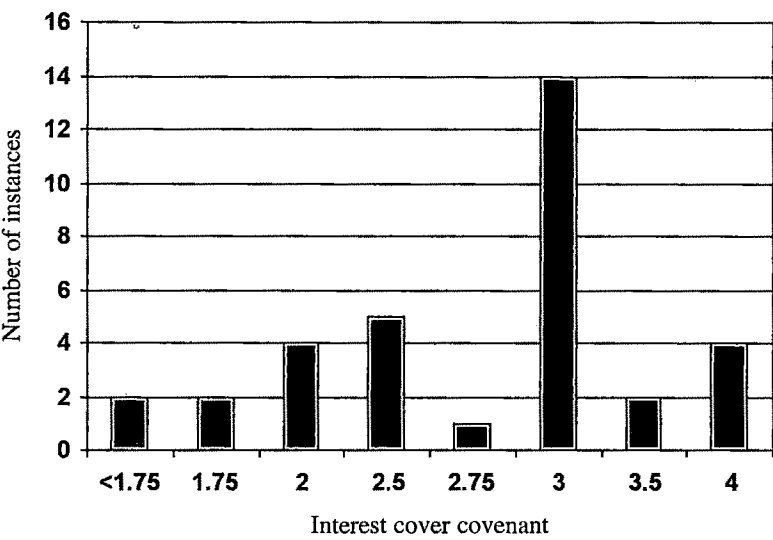


Chart 2
The frequency of levels of gearing covenant (debt/ shareholders funds)

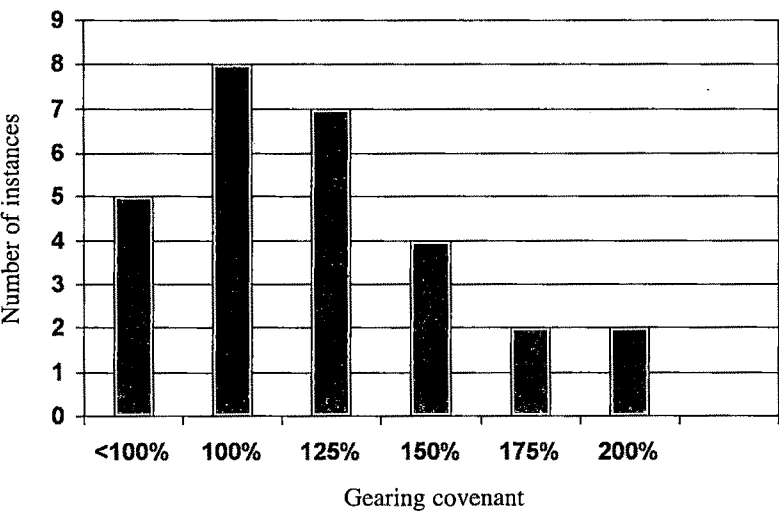


Table 3
Descriptive statistics for explanatory variables

	<i>Non-Cov Mean</i>	<i>Cov Mean</i>	<i>Difference T-statistics</i>	<i>Non-Cov Median</i>	<i>Cov Median</i>	<i>Difference Z-statistics</i>
Beta	0.91	0.93	-0.39	0.90	0.94	0.68
Z score	1.23	1.35	-0.10	0.76	1.07	0.17
DPR	0.73	0.38	1.44	0.42	0.33	1.76*
GEARING	0.29	0.32	-0.03	0.32	0.30	0.02
LNSALES	15.46	14.20	3.74***	15.36	14.23	3.56***
EBIT/TA	0.13	0.13	-0.07	0.10	0.11	0.10
EBITDA/TA	0.18	0.17	0.63	0.15	0.15	0.29
FCF/TA	0.10	0.09	0.33	0.06	0.09	0.23

For variable definitions see Table 2. SALES is natural log transformed to minimize impact of outliers. Accounting data are from the most recent accounting year ending prior to April 1999, the survey date. Beta is taken from the London Business School Risk Measurement Service as at the most recent date prior to April 1999. T is statistic for test of difference in means and Z is statistic for test of difference in medians. ***, ** and * represent significance at 1%, 5% and 10% levels respectively. Non-Cov = Non-covenanters; Cov = Covenanters. The sample size varies between 72 and 66 for different variables because of data non-availability.

Clearly, there is a size bias in this distribution with big firms tending to avoid covenants, a result confirmed in later analysis presented below. Whereas covenanters are distributed fairly evenly across the size bands, non-covenanters are clustered in the top bands. Companies giving no covenants were asked why they gave no covenants. Three companies that did not give financial covenants did not respond to this question. In other cases, multiple reasons were given. The dominant reason for not giving covenants was cited as 'policy not to give covenants', although four companies gave as the reason that they only used institutional (i.e. bond) markets, where covenants are less prevalent.

4.4. Industry characteristics of covenanters and non-covenanters

As noted in Section 2, industry affiliation of the borrower may influence the pattern of financial covenants. Both covenanters and non-covenanters in our sample are drawn from a wide range of industries identified by the two-digit industry classification of the London Stock Exchange. More than 22 industries are represented in our sample. To examine the industry influence on financial covenants we aggregate these industries into five larger categories that are likely to have broadly similar characteristics, such as liquidity, risk and profitability: We then test whether this larger industry affiliation differentiates between covenanters and non-covenanters. The industry groups (and the number of respondents falling into each

by covenanter and non-covenant) are as follows: manufacturing (12, 5); high technology (14,8); wholesale and retail (4,3); utility (13, 1); and service (12, 0). A chi-square statistical test of difference in these distributions across industries shows that there is no significant difference between them. Nevertheless, the extent of covenants and non-covenanters points to differences worthy of further examination. Notably, the typically high level of debt in utilities still attracts covenants.

We need to be cautious in interpreting the results because of the small sample sizes of the two groups. The test statistic for the difference in the distribution of our two subgroups of firms is not significant. Thus, industry seems not to influence the decision of the borrowers to sign or not sign covenants.¹²

4.5. Descriptive statistics on explanatory variables

Table 3 presents the descriptive statistics for the firm-specific characteristics of both covenanters and non-covenanters. The group mean and median are shown in the table. The table also provides the test statistics for the difference in means and medians of each of these variables between the two groups of borrowers. These univariate tests show that there is little difference between covenanters and non-covenanters in most of these firm characteristics. These two groups do not differ in terms of their systematic risk. Covenanter firms are also much more financially healthy than non-covenanters. The covenanters' mean (median) Z score is 1.35 (1.07) whereas non-covenanters have a much lower Z score, 1.23 (0.76). The differences are, however, not significant.

The strongest differentiator between covenanters and non-covenanters is firm size. In Table 3 this is measured by total sales log-transformed to

¹² The non-significance of industry affiliation is also borne out when it is included in our multivariate logistic regression models. We therefore exclude them from the models reported in Section 4.5 below.

Table 4
Logistic regressions of the covenant decision

	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
<i>Sample Size: 66</i>	<i>Coeff.</i>	<i>Sig.</i>	<i>Coeff.</i>	<i>Sig.</i>	<i>Coeff.</i>	<i>Sig.</i>
BETA	1.25	0.24	1.12	0.27	1.23	0.24
Z SCORE	-0.03	0.33	-0.03	0.33	-0.03	0.34
DPR	-0.17	0.28	-0.23	0.22	-0.18	0.27
GEARING	-1.11	0.27	-0.59	0.36	-1.05	0.26
LNSALES	-1.26***	0.00	-1.27***	0.00	-1.26***	0.00
EBIT/TA	0.35	0.47				
EBITDA/TA			-3.54	0.20		
FCF/TA					-0.10	0.49
Constant	18.99	0.00	19.90	0.00	19.03	0.00
Correct Classification%	83.30%		83.30%		83.30%	
Chi-square	16.39**	0.01	17.08***	0.01	16.39**	0.01
Nagelkerke R ²	0.323		0.335		0.323	

The decision to give or not give covenants is codified as a dichotomous variable with covenantor = 1; non-covenantor = 0. Explanatory variables are as in Table 2. Sample size is reduced for want of data on Z score. ***, ** and * represent significance at 1%, 5% and 10% levels respectively. Significance level is based on a one-tail test for explanatory variables while two-tail test for constant.

minimise the effect of outliers. Firms agreeing to sign financial covenants are smaller firms.

4.6. Multivariate analysis of the determinants of financial covenants

Table 4 presents the results of the multivariate logistic regression. The dependent variable is dichotomised and coded as 1 for covenantors and 0 for non-covenantors. Not all the variables from Table 3 are included in the analysis reported in Table 4 to avoid multicollinearity. Where the pairwise correlation is high (>0.30) only one of the collinear variables is included at a time.¹³

Firm size is the only, and strongly significant, variable in the model and it maintains its significant impact even when industry variables are dropped. Large firms are significantly less likely to sign up to covenants than relatively small firms. This result confirms the conclusion based on the univariate analysis reported above. The ability of

the larger firms to avoid giving financial covenants may be a reflection of their lower risk, greater liquidity or higher reputation. Larger firms may also be able to use their bargaining power to force private debt providers not to make lending conditions too onerous. This size impact prevails even when we control for other firm characteristics that may, a priori, influence the decision to demand or provide financial covenants. In unreported analysis of the size ranking of the sample firms, we find that out of the 55 covenantors, 43 are between 51 and 200 whereas only seven of the 17 non-covenantors fall into those ranks.

The impact of accounting profitability and free cash flow measures is insignificant. Similarly, the firm's risk profile, whether measured by financial leverage or by stock market-based systematic risk, has little influence over the decision to provide covenants. Overall the conclusion is size matters and little else does.¹⁴

How big is the impact of size? The logistic model provides an estimate of this. When the borrower's sales revenue, our proxy for size, doubles from the sample median SALES (LNSALES) of £1.95bn (14.48) to £3.90bn (15.18), the probability of the borrower giving financial covenants decreases by 20.2%. If the size trebles to £5.85bn (15.58), the probability is further diminished by 32.1%. On the other hand, if the firm size halves from the median level the probability increases by 20%. These probability changes are consistent

¹³ Given that size is the only significant variable in our logistic model, we also re-estimate the model with only size. Our conclusions and estimate of the impact of size on the probability of giving covenants are unchanged (see below) and therefore robust to the presence or absence of other variables in the logistic model.

¹⁴ In Models 1 to 3 in Table 4 some other variables (e.g. DPR, EBITDA/TA and BETA) have large coefficients that suggest that their economic impact may be large. However, the small sample size may have caused that impact to be statistically insignificant.

Table 5
Multiple regression of margin on explanatory variables

Variable	Coeff.	t-statistic	Sig.	No. of Obs.	Adj. R ²
Model 1				37	-0.04
(Constant)	1.178	1.72	0.09		
BETA	0.156	0.74	0.23		
Z score	-0.001	-0.18	0.43		
DPR	-0.003	-0.05	0.48		
GEARING	-0.182	-0.85	0.20		
LNSALES	-0.067*	-1.40	0.09		
EBIT/TA	0.476	0.78	0.22		
Model 2				37	-0.06
(Constant)	1.246	1.73	0.09		
BETA	0.137	0.63	0.27		
Z score	-0.001	-0.16	0.44		
DPR	-0.002	-0.04	0.49		
GEARING	-0.151	-0.78	0.22		
LNSALES	-0.070*	-1.43	0.08		
EBITDA/TA	0.256	0.44	0.33		
Model 3				37	-0.06
(Constant)	1.365	1.96	0.06		
BETA	0.148	0.66	0.26		
Z score	-0.003	-0.39	0.35		
DPR	-0.002	-0.03	0.49		
GEARING	-0.121	-0.75	0.23		
LNSALES	-0.077*	-1.63	0.06		
FCF/TA	0.110	0.58	0.28		
Model 4				40	0.04
(Constant)	1.203	2.35	0.02		
LNSALES	-0.059*	-1.62	0.06		

For definitions of explanatory variables see Table 2. Margin is in percentage. 't' is Student t test statistic. ***, ** and * represent significance at 1%, 5% and 10% levels respectively. White's (1980) heteroscedasticity adjusted t-statistics are reported. Sig. = Significance level is based on a one-tail test for explanatory variables while two-tail test for constant. In all models the variance inflation factor (VIF) is less than two for any variable, well below the acceptable level of 10 for multicollinearity (Gujarati, 2003).

across the three models in Table 4 and when LNSALES is the only explanatory variable.

The foregoing results show that our hypothesis H1, i.e. *firm specific characteristics of the borrowers are irrelevant to the decision of borrowers to offer financial covenants*, is not supported. We find that borrower size is a significant determinant of this decision.

4.7. Do financial covenants influence debt-pricing?

We have only limited data on the margins over LIBOR made available by the survey firms. Among the 55 covenanters in our sample, 40 firms reported margin data. The mean (median) margin is 37.5 basis points (35.0 basis points). Among the covenanters, 37 give traditional covenants, five give new covenants and 13 give covenants of both

types. Among those for which we have margin data, we find that the differences among these three groups of covenanters in margins over LIBOR are not statistically significant. However, the small size of the new covenant group and the overlap between groups caused by firms giving both old and new types of covenants may have considerably weakened our tests. Nevertheless, in our sample, covenant type has no influence on the pricing of debt. Therefore, our hypothesis H2, i.e. *the type of financial covenants given has no influence upon the pricing of private debt*, is not refuted.

In Table 5 we present the results of the multiple regression of the margin on borrowing on a number of other variables that are expected to influence the pricing of debt. These are the same variables as those we used in modelling the

covenant-giving decision since they are expected to influence both that decision and the related issue of pricing debt.¹⁵ The sample size for this regression is reduced to 37 for want of data on some of the explanatory variables e.g. BETA and Z score.

Once again, the only variable that has a significant impact is borrower firm size. We then re-ran the regression with LNSALES as the only explanatory variable (see Model 4 in Table 5). This model shows that the variable is significant at the 6% level. Larger firms are able to reduce the margin they pay significantly.¹⁶ With this model, we estimate that, when the borrower size, i.e. sales, doubles from the sample median of £1.95bn to £3.90bn, the margin on borrowing falls from about 35.5 basis points to 31.2 points.¹⁷ Overall, our analysis, perhaps owing to the small sample size, sheds only limited light on how borrowers and lenders reach a pricing agreement.

4.8. Robustness tests

In the analysis so far, data on our explanatory variables are for only one year from the financial statements immediately preceding the time of survey i.e. April 1999. Since one year's data may not reflect the stable characteristics of the borrowing firms, we also re-run our models in Tables 4 and 5 with the accounting data averaged over the three accounting years preceding April 1999. The sample size is reduced by data non-availability for some firms over all three years to 56 for the logistic model and to 32 for the margin model. As regards the logistic model, we still find that borrower size is the only significant variable (significant at 1%) and larger firms are less likely to give covenants. For the margin model, we find that

the size coefficient is negative but insignificant. However, when we run the margin model with only LNSALES as an explanatory variable, the regression coefficient is -0.063 and significant at the 6% level, similar to Model 4 in Table 5. The sample size remains unchanged at 40. This increases our confidence that sampling variation or the length of time over which the explanatory variables are estimated does not affect the basic result that borrower size has a significant, though weak, negative impact on loan margins but a much stronger negative impact on the covenant giving decision.

From these various analyses, we conclude that borrower size is the most important and, on our evidence, the only variable that significantly influences both whether the borrower gives covenants and at what price. None of the other firm characteristics has any influence on either aspect of the covenant problem. Our hypothesis, H3, i.e. *pricing of private debt is independent of borrower characteristics*, is not supported. Borrower size does have a significant impact on pricing. The margin-reducing impact of borrower size is consistent with the finding of Beatty et al. (2002).¹⁸

4.9. Overview of empirical results and future potential research

Our empirical results suggest that the decision to give covenants is not determined by the idiosyncratic characteristics of the borrower apart from its size. There is little variation in these covenants across different borrower industries. Overall our results point to covenants not being sufficiently customised to match borrower characteristics. It appears that banks use covenants as a way of monitoring relatively small borrowers. UK banks seem to rely on size as a proxy for the financial strength and reputation of borrowers to reduce their agency problem with the latter. The large borrower size then substitutes for covenants as a monitoring tool for lenders. These results are consistent with the agency model of financial covenants.

There is also little variation in debt pricing irrespective of the type of covenant given. Only borrower size has a weak and negative influence on debt pricing. Thus we find only limited evidence for the implication of the costly contracting hypothesis that debt pricing reflects the special characteristics of the borrowers.

The sole reliance of lenders on the borrower size to determine both the obligation to offer financial covenants and the amount of the borrowing margin raises some intriguing issues. Lenders seem to be ignoring the information content of variables traditionally and empirically associated with firm risk, debt service capacity and financial distress. These are inadequately proxied by firm size alone.¹⁹ While financial distress risk is known to fall with

¹⁵ As with the Table 4 models, we consider the pairwise correlations among explanatory variables in Table 5 OLS models and exclude highly collinear variables. In our test for collinearity, the variance inflation factor (VIF) statistics show that none of the remaining variables poses a collinearity problem with a maximum VIF of only 1.57. On this test, see Gujarati (2003:362–363).

¹⁶ We apply a one-tail test since our expectation of the direction of impact of the explanatory variables is a priori clear. Moreover, a one-tail test has also more power to reject the null hypothesis of no impact when it is not true.

¹⁷ As with the covenant models in Table 4, we find that some variables like BETA, GEARING and EBITDA/TA have large coefficients that suggest their economic impact may be large though the small sample size may have caused their statistical insignificance.

¹⁸ Beatty et al (2002) investigate the determinants of margin (called spread in their paper) in terms of loan specific characteristics rather than borrower specific characteristics except for borrower size. They report mean borrower size (natural log of sales in \$) of 5.64 compared to about 15 (in £) in our study (see Table 3 above). Thus our sample consists of much larger firms.

¹⁹ Sample Pearson correlations show that LNSALES has a significant correlation only with DPR (0.18) and GEARING (-0.25). Pearson correlations are of a similar magnitude. These correlations are not large, albeit significant. With all the other variables the correlations are insignificant.

firm size, in negotiating the covenant decision and the margin for borrowing, the lenders and borrowers seem to use a blunt instrument rather than fine-tune their decision to the more elaborate, but nevertheless relevant, borrower characteristics. This calls into question the purpose and efficacy of various covenants from the borrower's point of view.

The reasons for lenders not to fine tune the covenant requirements and margin on lending to borrower characteristics must remain speculative at this stage. It is possible that lenders do not employ elaborate models of risk assessment which incorporate the variables upon which the covenants are based e.g. EBITDA/ total assets. The cost of modelling may be high enough not to warrant such sophisticated models. Alternatively, there may be other information that lenders use as effective proxies for the explanatory variables in our models. In other words, our models may suffer from a missing variable problem. It is also possible that the cost of tailoring specific covenants to borrower characteristics is too costly for the lenders to undertake. Basing the covenant and pricing decisions on a single variable certainly has the virtue of simplicity and may therefore be cost effective. It is also possible that our small sample from one particular time period provides only a cross-sectional snapshot of the covenant and pricing decisions and does not capture the full complexity of the decision and negotiation processes. From the borrower's perspective, it is not clear why some large firms are able to avoid covenants and yet others concede them. It may be that the borrowers who do concede the covenants do not regard them as costly contracts in that they might not provide meaningful constraints and equally that bankers find it easier to lend with covenants as a form of lending that is regarded as legitimate within the bank.

To confirm these speculations, two forms of research would be valuable: first, a systematic, qualitative survey of lenders and borrowers to establish the attitudes to tightness of covenants and towards the determinants of margins and how they are negotiated and, secondly, a longitudinal study comparing levels of bank borrowing, tightness of covenants and levels of economic activity. The latter is likely to provide an insight into how covenants and pricing decisions evolve over time, taking into account the lenders' and borrowers' prior learning experience from their past interaction and from relationship banking.

5. Summary and conclusions

In this paper, we examine financial covenants in private loan agreements within the frameworks of the agency model and costly contracting model. We focus on private loan agreements rather than

public debt agreements since the costs of specifying financial covenants to match the borrower profile may be less in private contracts. Since loan agreements are individually negotiated between private lenders and corporate borrowers they may allow for customising the financial covenants rather than the use of 'boiler-plate' financial covenants, more common among public debt agreements.

We test the proposition that the decision of borrowers to provide covenants will be determined by their firm-related characteristics such as size, reputation, risk, or liquidity. Using survey data from borrowers among the largest UK corporations we model this decision. We find that the only variable that significantly influences the decision is the borrower size. Although we find that covenanters are more healthy companies with a lower bankruptcy risk and that they exhibit a higher level of systematic stock return risk, neither difference is significant. This suggests that private lenders are still not fine-tuning financial covenants to suit their client profiles. It appears that financial covenants have a limited and broad purpose rather than one geared to close and specific monitoring of borrowers.

We also test whether borrower characteristics influence the pricing of private debt. We find that none of the borrower characteristics has any impact on the cost of borrowing to corporate borrowers except borrower size. We observe that financial covenants are still predominantly accrual accounting-based although there is some small trend towards using cash flow-based measures. Thus in spite of advances in cash flow based reporting, accrual accounting still holds sway. Our results are much more consistent with the agency model of financial covenants as a monitoring tool than with the costly contracting hypothesis that lenders customise financial covenants to match different borrower characteristics in order to influence the pricing of their lending.

Many of the borrower characteristics that, a priori, are expected to influence the giving of covenants and the pricing of private bank debt are found to have little influence. Our data sample was drawn from a single year and covered only 72 debt contracts. Future research of a longitudinal nature with larger samples may explain whether our results are due to a limited sample size and timing. Such research may also include other borrower and lender characteristics not examined in this study. Our research has been restricted to non-financial firms because of the special characteristics of financial firms' accounting numbers and capital structures. Future research may focus on the latter firms to examine the types and range of financial covenants they offer to their lenders and how their debt is priced. Further, our results are specific to the large UK firms and future research can extend

the sampling to medium and small firms to see whether factors other than size are also relevant.

Use and tightness of financial covenants may also depend on the strength of the banking relationship, the stage in the economic cycle (Hall, 2002) and loan-specific characteristics (Beatty et al., 2002). These likely determinants may be examined in future research.

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Book Reviews

The Development of the American Public Accountancy Profession: Scottish Chartered Accountants and the Development of the Early American Public Accountancy Profession. T. A. Lee. Routledge, 2006. xiv and 176pp. £70.

The Scots have contributed disproportionately to the creation of today's world. Even if Arthur Herman's 2004 book *How the Scots Invented the Modern World* is something of an overclaim, it contains more than a grain of truth. In particular, migrant Scots have made an outstanding contribution to the development of the US. A few examples spring immediately to mind. John Witherspoon, Paisley divine, went on to become a signatory to the US constitution and an early president of Princeton University. Andrew Carnegie's steel empire and his philanthropic work are so well known as to need no further comment. And so on...

A little-understood aspect of the Scottish diaspora is the contribution of Scottish accountants to US business life, a subject addressed in Tom Lee's new book. It consists of an analysis of the biographies of 177 Scottish accountants who left Scotland for the US between 1875 and 1914, highlighting the disproportionate influence they went on to exert on US public accountancy.

As readers might expect from Tom Lee, the book is a model of clarity both in structure and expression. It represents many years of the kind of painstaking work that could only be a labour of love. Anyone who has attempted to construct a family tree will know how long it takes to research the information. Lee has done this, and more, for 177 accountants, on a bilateral basis, with some help in the early stages of the project from his Edinburgh and Alabama students, which is duly acknowledged.

Chapter 1 briefly documents the career of Eric Mackay Noble, the first of the 177 migrants. At the age of 28, in 1875, he left Greenock for New York, a CA who had qualified as a member of the Society of Accountants in Edinburgh. Typically, he had a middle-class background, going on to carve out a career as a resident accountant undertaking court work.

In Chapter 2, Lee points out that the migratory accountants were typical 'mobile Scots', prepared to go anywhere in the country or in the world to better themselves. He informs us that some

800,000 Scots left for the US in the century to 1914, with 600,000 heading for Canada at the same time – colossal figures for a small nation.

Some leading schools appear almost to have had an *ethos* of preparing pupils for careers beyond Scotland, and in Chapter 3, we learn that Edinburgh Academy saw 55% of its well-heeled students leaving their country between 1875 and 1914, including nine of the CAs in the study.

Chapter 4 consists of informative potted economic histories of the main cities from which the emigrants left, Aberdeen, Edinburgh and Glasgow, as well as of the main cities to which they went, Chicago, Minneapolis and New York.

The development of the indigenous US profession comes next, in Chapter 5, and here Lee traces the succession of local professional bodies which went on to form the American Institute of Certified Public Accountants. He notes that none of the Scots accountants studied was involved in obtaining the first CPA legislation, passed in New York in 1896, but that within a decade or so, Scottish accounting immigrants were involved in 'most of the major boards and societies created at this time'.

The opening of permanent offices in the US by British accountancy practices was a significant development relative to the study. Jones, Caesar and Company, an agency of Price Waterhouse, had an English and a Scottish partner, the latter being William Caesar (an Edinburgh CA), one of the immigrants examined. This firm gradually built up a portfolio of indigenous US audits, including railway companies, JP Morgan and Rothschild's, although initially set up to audit US operations of UK-owned companies.

Arthur Young was one of a small minority of the migrating accountants who was unqualified in accountancy on leaving Scotland. He set up his practice in Chicago from 1894, laying the foundations of a firm which became a predecessor to one of the four largest multinational accountancy practices in the world today. Young returned to Scotland in the early 1900s to recruit staff, whose biographies are provided in the book.

Of great significance also was the firm of Marwick, Mitchell and Company, formed in 1897 by James Marwick, a Glasgow CA, and Simpson Rodger Mitchell, unqualified in accountancy at the time of emigration. This firm, too, in due course metamorphosed into one of today's 'Big Four'

multinational accounting practices. The firm advertised for accounting staff in the 'Thursday edition of the *Glasgow Herald* newspaper', and those who responded have been given biographies in the book, as have the founders of their firms.

In Chapter 6, preceding the biographies, Lee analyses his data. Of the 177 who arrived in the US, 33 left again. About one-third of immigrants were of working-class origin, two-thirds middle class and above. Most had limited post-qualifying experience, a function of their age. Some two-thirds ended up working for six large and extremely important public accountancy firms with strong Scots or UK connections, the majority of the remainder being employed by small local firms, with the balance in industry.

This study is a splendid example of what a prosopographic (i.e. biographically-based) historical study can achieve. As one reads the individual biographies, though, one is also struck by the pathos of many of the lives described. Some died tragically young or were cut off in the Great War. Arthur Young himself disclosed that a number of the immigrant accountants had alcohol problems, hence their departure from Scotland. He, himself, had to overcome deafness. As we discover the diverse social and occupational backgrounds of those studied, we learn more about old Scotland and new America, but are also reminded of the seeming randomness of life.

The success of this fine study owes much to its author's personal and emotional attachments. As well as having conducted his career as an academic accountant in both countries, among his many distinctions he values the award in 1963 of the Albert J Watson Prize: endowed in 1961 by a Glasgow CA (1908) who, the book informs us, had a colourful and highly distinguished public accountancy career in the US.

University of Paisley

Sam McKinstry

Ethics and the Individual Professional Accountant: A Literature Review. Ken McPhail. Institute of Chartered Accountants of Scotland, 2006. ix + 117pp. £15. ISBN 1 904574 10 6

The medium of a research monograph is an excellent opportunity for exploring professional ethics; it provides the scope to recognise more of the fullness of the range of complexities that come with messy reality than conventional journal papers allow, yet it benefits from critical peer review. A monograph can be relatively succinct but avoid over-simplification, coupling both discipline-specific and cross-disciplinary insights. Ken McPhail has used well his opportunity to offer depth and breadth, including topics such as the:

- ethical predisposition of accountants, in particular the nature of the ethical individual;

- structure of ethical issues that individuals face;
- characteristics of professions and professionalism;
- changes in the perceptions and experience of professionalism in diverse activities and from different countries; and
- means to start engaging with changing conceptualisations and expectations.

Even so, this monograph does not have to attempt a comprehensive coverage. It is one of a series following the seminal 'Taking Ethics to Heart' (Helliard and Bebbington, 2004) that was prepared for the 150th Anniversary of the Institute of Chartered Accountants of Scotland (ICAS), deliberately to synthesise high-quality research with pragmatic guidance for future decades. Such positioning and pedigree enables McPhail to draw together selected strands to emphasise the seriousness of his core argument, that accountants must recognise a major crisis of credibility. Post-Enron, with the dramatic demise of Andersen, the profession's members have to ask of themselves and colleagues, not merely how to cope with an embarrassingly large number of proverbial 'bad apples' (assumed in a barrel of otherwise wholesome fruit) but more basic questions.

Reflecting on the combination of problems revealed, the reader is left pondering fundamentals such as: "*what is the authority of the accountancy profession?*". Accountancy has traditionally been essential to the functioning of the capital market system. Its legitimacy comes from providing confidence and assurances to the socio-political and economic order that is widely prevalent and dominant. But multiple malfunctions (such as led the market to destroy Andersen) cause lingering questions, as: "*how can, or should, society still place credence on any accountant's work?*"

For McPhail, the increasing loss of confidence should trouble not only accountants but also represents a post-modern scepticism within society for the role of all professions and business. The resultant challenge for accountancy practitioners wishing to continue to apply their skills for reward in local or multinational firms goes beyond just tightening existing procedures. Rather, they need to explore shifting expectations of a doubting public and to probe what are, and should be, their own underlying civic responsibilities.

However, this depiction and analysis may itself embody a prevalent problem. Despite the monograph's eloquence, it may appear remote, or at best too disconcerting, for many a busy accountant. She/he is not opposed to ethics; she/he has trained for several years then worked hard to remain up-to-date; she/he will try hard to operate with competence and diligence; and with objectivity and integrity. But clients' or bosses' opinions cannot be ignored. All has to be consistent with the recurring

need to generate fee-income or earn a salary. Without the privilege of academic tenure and guaranteed (if lower) salaries, the summit of ethical aspirations may be to balance daily the varied conflicts of interests encountered (of several other parties and not just of self) without too many hostages to fortune (or litigation). This requires a combination of technical expertise, empathy and probity not independent-thought alone. It represents the apparent pragmatic necessity of getting on with a job within a flawed, but still working, system. The temptation to consign the Enron/Andersen debacle to a 'one-off' (caused by excessive greed and rule-based thinking by distant individuals) is not necessarily wilful complacency. Simply, searching for a vision of a different utopia may appear a luxury for which the resources of time, space or energy seem unaffordable.

Lacking overt sympathy for this situation, the monograph may be less persuasive to that broader readership. Nevertheless, it provides an important service in probing the comfort zone of the accountancy profession. Questioning and visionary advice from a knowledgeable and perceptive observer has an essential role, deserving of respect.

It seems greatly to ICAS's credit that it should fund and facilitate these studies. Its collective willingness to do so represents a risky 'taking-to-heart'. For such explorations may, as logical ends, prompt from readers still more difficult questions that professional Institutes might well recoil from answering: *"should an institute (or academics, or ethical commentators, for that matter!) consciously set out to promote higher standards of ethical expectation and to provide moral leadership to the society in which its members live? Or, is it acceptable only to adopt and adapt to norms of 'best practice', while being under no obligation to try to*

transcend or enhance this?"

The monograph does not specifically raise these linked questions, perhaps justifiably. Only practitioners, of and for themselves, can decide on their willingness to undertake such a role. Regulators and society might nudge; overtly encourage or else pour scorn on bids to shape a wider ethical culture. To attempt a leadership role might appear a hubristic arrogance for a profession with only a symbiotic (some might say parasitic!) relationship with the business community, society's primary economic generator. To succeed in leadership would require widespread consensus, after proper debate among all members who would bear the significant and direct personal costs of participation.

Although the monograph can only prompt such thoughts, not deliver answers, its value comes in establishing and informing the debate in a scholarly and not-too-inaccessible way, for those who make the time to read it. For them, it gives an insightful literature review, with, notably, many prescient references from the 1980s and 1990s. However, it can, and does, also make recommendations, primarily for education and as part of ongoing 'work-in-progress' rather than as definitive solutions. Again, this is justifiable because to determine what are the roles and routine functions of accounting within society, and thence what ethical attributes are necessarily inspirational to accountants, is a profound, enduring and changing challenge that each generation needs regularly, perhaps even continuously, to keep addressing for itself.

University of Aberdeen

David Molyneaux

Reference

- Helliar, C. and Bebbington, J. (2004) *'Taking Ethics to Heart'*. Institute of Chartered Accountants of Scotland, Edinburgh.

Call for papers for a special issue of *Accounting, Auditing and Accountability Journal*: “Accounting and the Visual”

This special issue aims to contribute to a recent and steadily growing interest in organizational visual images and methodologies with particular application to the field of accounting. In essence, the practices of accounting for and auditing organizational activity relate to visualisation – rendering tangible and intangible values visible in the form of reports, charts, graphs, diagrams, and pictures for instance. These artefacts can fruitfully be studied from a visual perspective as being traces of – and drivers for – organizational action, processes and culture, as indeed can organizational artefacts more generally. Likewise, the changing image of accounting as a profession can be read visually, for example trends in corporate architecture, space and accountants’ professional identity.

The extent to which organizations trade on their image in such societies is also worthy of attention. Branding, organizational and/or corporate aesthetics management, and the construction of symbolically redolent buildings are all visual activities, and ways of accounting *for* the visual is also a theme we might usefully engage with. For example, in New Zealand, the ‘arts bonus points’ scheme allows organizations to gain more favourable planning decisions if they agree to invest in and display publicly accessible artworks in their buildings – importantly, these points are tradable, effectively creating a market that leads to the concept of an ‘aesthetic bottom line’ (Monin and Sayers 2006). In addition, accounting and management control processes can be studied visually through the use of documentary photography, photo-elicitation techniques and respondent-led photography.

In sum, as contemporary societies become defined by their ‘visual culture’ and technological advancements mean that ‘the image’ becomes all-important in every sphere of life, so organizational and accounting scholars must engage with these developments theoretically, empirically and methodologically. To date, the role of images and the visual world has been strangely overlooked in organizational research despite having a healthy provenance in the social sciences more generally, and a prominent profile across arts disciplines and associated cultural studies. This special issue aims to begin to rectify this neglect.

With these ideas in mind, we invite contributions that address *any* aspect of the visual and accounting, whether theoretical, empirical or methodological. We would particularly welcome creative, innovative approaches to the topic. An indicative, but not exhaustive, list of what we see as potential questions or approaches of interest is given below:

- Financial reporting as visual artefact
- Reflections of the image-dominated society within accounting
- The impact of developments in visual technology on accounting
- Visual representations of tangible and intangible values
- Visual rhetoric and accounting
- The role of the visual image in branding
- Corporate aesthetics management
- Accounting *for* the visual image
- Management accounting and the visual
- Architecture and the accounting profession
- The changing visual image of accountants’ professional identity
- Visual images as historical records of accounting interest
- Photo-elicitation as a contemporary and/or historical research method
- Respondent-led photography as a research method
- Parallels between art and accounting
- Studies that criticise the desirability of an increasingly visual approach

The submission deadline for this special issue is 1 March 2008, but earlier submissions are welcomed. Manuscripts should be sent electronically by email (in a word file format) to Dr Samantha Warren, University of Portsmouth (sam.warren@port.ac.uk). All papers will be reviewed in accordance with *AAAJ*’s normal processes. Authors are asked to follow *Accounting, Auditing & Accountability Journal*’s standard formatting requirements. For details, visit <http://www.emeraldinsight.com/info/journals/aaaj/notes.jsp>.

Authors wishing to discuss their papers prior to submission may contact any of the three guest editors:

Dr Samantha Warren, University of Portsmouth, UK (sam.warren@port.ac.uk)

Prof. Lee Parker, University of Adelaide, Australia (lee.parker@adelaide.edu.au)

Dr Jane Davison, Royal Holloway, University of London, UK (jane.davison@rhul.ac.uk)

Bursaries for PhD students

In a significant new initiative to support academic accounting recruitment, the Chartered Accountants' Livery Charity, CALC, has announced the establishment of an annual bursary of £15,000 to provide funds for an ICAEW member to study for a PhD in an accountancy related subject at a UK university, in order to prepare them for an academic career. The scheme is aiming for a September 2007 start. The size of the award will be £15,000 a year for up to three years. (Under current Inland Revenue rules it is understood that this amount should be tax-free.) CALC will normally expect a matching commitment (such as the waiver of fees and/or a contribution to the student's maintenance) by the host university which should reflect the size of CALC's award. CALC will promote the development of a relationship with the successful candidate: it will follow the successful candidate's progress closely and may invite him or her to some of its functions and dinners.

Further information and application forms are available from Gillian Knight at the ICAEW, who will also be able to assist with any other queries. Contact details are:

Gillian Knight,
Research Manager, Centre for Business Performance,
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PO Box 433
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Telephone: 020 7920 8478
E-mail Gillian.knight@icaew.com

Application forms for a 2007 start should be returned to Gillian by **15 June 2007**.

Guide for Authors

General

Manuscripts should be in English and consist of original unpublished work not currently being considered for publication elsewhere. The paper should be submitted electronically as Microsoft Word files via e-mail to abr@cch.co.uk. An electronic acknowledgement of receipt will be sent by return.

If you have any problems sending a Word file as an attachment to an e-mail, please send an e-mail to the above address explaining the difficulty.

Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the paper shares data with another paper, an electronic copy of the other paper must be provided. Authors of accepted papers will also be asked to assign exclusive copyright to the publishers.

Presentation

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Watts, R.L. and Zimmerman, J.L. (1986). *Positive Accounting Theory*. Englewood Cliffs, NJ: Prentice Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelt with an 's', not a 'z'. Single quotation marks should be used, not double.

Accounting and Business Research



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Paula Arkell: an appreciation

Contributors to ABR over the past 10 years have regularly expressed their gratitude for the care and consideration shown by Paula Arkell as production editor in transforming their work from manuscript to finished article. This is Paula's final issue of ABR, as the production work now moves in-house. On behalf of the current and previous editorial teams, and all our authors, I would like to record our considerable appreciation of the high standard Paula has maintained in supporting the journal's contribution to research developments.

Pauline Weetman

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All papers are subject to peer review on a double blind basis, either by members of the Editorial Board, or by invited reviewers of international standing. Reviewers are asked to comment in particular on the contribution, motivation and rigour of the analysis presented in the paper. The editor carries out an initial check that papers submitted comply with the guide to authors and advises authors where a paper has not met the essential criteria. Continuous monitoring of the review process aims at providing timely but informative feedback to authors. Subject to the recommendation of reviewers, research notes and commentaries may be published.

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The value relevance of 'realistic reporting': evidence from UK life insurers

Joanne Horton*

Abstract—Even under the International Financial Reporting Standard 4 (IFRS 4), the current accounting regime for UK life insurance companies is oriented towards delaying the recognition and distribution of profit, and still remains largely rooted in traditional requirements for statutory solvency reporting. This paper tests empirically the value relevance of the alternative 'realistic reporting regime' of voluntary embedded value (EV) disclosures that has been generally adopted by leading UK and Continental European insurers. In recent years, EVs have also been used internally (but not disclosed) by many US life insurers. The results found here are consistent with value relevance and some implications for standard-setters are explored.

Key words: Embedded value, life insurance, value relevance.

'Although there seems to be considerable support for the view that reliability should be the dominant quality in the information conveyed in the financial statements, even at the expense of relevance, while the opposite is true of information conveyed outside the financial statements, that view has in it the seeds of danger....If it were carried to its logical conclusion...the end would be that most really useful information provided by financial statement reporting would be conveyed outside the financial statements, while the audited financial statements would increasingly convey highly reliable but largely irrelevant, and thus useless, information.' (FASB 1980, para. 44, quoted by L. Todd Johnson in 'Relevance and Reliability', the FASB Report, No.265, 28 February 2005.)

1. Introduction

Despite the implementation of the new International Financial Reporting Standard IFRS 4 *Insurance Contracts* on insurance reporting (IASB, 2004), the current accounting regime for UK life insurance companies is still oriented towards delaying the recognition and distribution of profit and remains largely rooted in requirements

for statutory solvency reporting. A number of pressures, external as well as internal, have caused a major re-evaluation of this statutory approach and as a result life insurance accounting has been undergoing a revolution during the past two decades, both in the UK and internationally. One striking feature of these developments has been the emergence around the world (in particular in the UK and in 'old-Commonwealth' countries such as Australia, Canada, New Zealand and South Africa) of alternative reporting bases that aim to improve conventional life insurance reporting by introducing 'value-based' approaches. Within the UK, the insurance firms currently publish these value-based approaches as supplementary information (with the exception of bancassurers who include them within their main consolidated balance sheet and income statements). The use of value-based approaches in North America has been much slower than elsewhere. They were initially adopted by some US insurers due to the demands from their foreign parent companies. Now US firms are more generally using such methodologies internally, although as yet they do not disclose the resulting information. For example, a survey conducted by Deloitte (2005) found that over half of the chief financial officers questioned, from large to mid-size American life companies, stated that they were using value-based measures such as embedded value for their internal performance measurement.

The objective of this paper is to ascertain whether these value-based approaches, known as 'realistic reporting', are value relevant to the stock market value of a firm's equity and whether they have incremental explanatory power over and above the accounting outputs of the current report-

*The author is at the London School of Economics. Financial support from the PD Leake trust (a trust associated with the Institute of Chartered Accountants in England and Wales (ICAEW)) is gratefully acknowledged. The Centre for Business Performance manages all grant applications. Gratitude is expressed for financial support and technical advice from Deloitte and KPMG for the research project on life insurance accounting of which this work forms a part. None of these organisations necessarily agrees with any of the opinions expressed here, for which the author remains solely responsible. The author would also like to thank the reviewers and Professor Richard Macve and Professor Michael Bromwich for their helpful comments and suggestions. Dr Horton can be contacted by e-mail: J.Horton@lse.ac.uk

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¹ By 'value relevance' is meant that there is an association between the disclosure or recognition of the accounting metric of interest and the level or behaviour of stock prices. This does not necessarily imply causation (Barth et al. 2001).

ing regime.¹ The findings here do suggest affirmative answers to these two questions. This is despite the views expressed by some within the industry sector that the numbers are not reliable relative to the main statutory accounts and suffer from a number of methodological problems. Given these findings the paper then considers whether the accounting standard-setters, such as the International Accounting Standards Board (IASB) and the US Financial Accounting Standards Board (FASB) should consider the possibility of including these value-based methods within the accounts produced using main life insurance generally accepted accounting principles (GAAP) and whether users and preparers should lobby for such a change. To date, the 'realistic reporting' appears to have grown in popularity with analysts and preparers in inverse proportion to its acceptability to accounting standard-setters. This is despite the IASB's and FASB's broad proposals in revising the *Conceptual Framework*, that financial statements should aim to provide information to a wide range of users, i.e. financial statements should not simply be focused on the special information needs of particular types of users, such as regulators, who primarily use the financial statements to help them assess an entity's liquidity and solvency (IASB, 2006).

The contribution of the paper is therefore to provide a rigorous test of the widely held view that supplementary embedded value reporting is of greater relevance to the assessment of the value of life insurance businesses than traditional statutory reporting.

Given the particular features of the life insurance industry and their complexity, Sections 2 to 4 of the paper set out the background, the pressures for accounting change and the nature of – and reactions to – the approaches to 'realistic reporting' that have been developed in recent years. Sections 5 to 8 present the empirical investigation. Section 9 concludes.

2. Background to life insurance accounting²

Traditionally in the UK the amounts reported in the Companies Act accounts reflected the 'statutory solvency' basis, which began with the 1870 Life Insurance Companies Act. Underlying this regime has been the existence of the long-term business fund (or funds), which has long been protected by law for the security of policyholders by providing that any profits can only be released following a professional actuarial valuation to certify the adequacy of the fund to meet its liabilities. This methodology is oriented towards delaying the recognition and distribution of profit. This is achieved by applying excessively conservative es-

timates (i.e. over and above a normal allowance for risk) to the various future elements, including the discount rate. Thus, future premiums are understated, claims estimates are conservative (e.g. by utilising conservative actuarial mortality tables), and expense estimates may be biased upwards, while any potential favourable impacts from lapses by policyholders are ignored. As a consequence the insurance policy is reported initially as having a negative net present value (NPV), creating an initial deficiency to be covered out of existing reserves (known in the UK as 'new business strain').

The effect of this is that even good-quality new business can, in addition to the cash flow losses, also generate accounting losses for the insurer and these can persist for the first three to six years of a policy.³ Thereafter, the accounting profits and cumulative cash flows on the contract start to become positive and apparent only in the medium-term, as the build-up of fees and premium receipts offsets and eventually exceeds the initial deficit. So over the life of the policy (assuming initial realistic expectations are realised), there will be a flow of 'surpluses' as statutory estimates prove to be over-conservative, and this will tend to give a pattern of higher profits towards the end of the policy life. This type of accounting consequently results in the following paradox: any insurer that is a new entrant, or any established player that is particularly successful in generating substantial new life business, can easily end up reporting accounting results and solvency margins that appear significantly worse than those visible in the accounts of peers who have a mature, profitable book involving relatively little new business.

The introduction of the European Union (EU) Insurance Accounts Directive (IAD) in 1991, and its subsequent implementation with effect from 1 January 1995, led to a presentational change and the introduction of the 'Modified Statutory Solvency Basis' of accounting (MSSB). This follows the conventions of 'ordinary' accrual accounting whereby initially the policy is regarded as having a value no greater than any cost expend-

² Fuller detail is given in Horton and Macve (1995, 1997, 1998, 2005) and Horton et al. (2007) on which this section is based.

³ Standard and Poors, Corporate Securitization, 30 September 2004.

⁴ These normally include up-front commission payments, costs of setting up the policy on the company's administration systems, performing underwriting and policy issue functions and carrying out medicals and inspections, although IASB is currently reconsidering their appropriate definition.

⁵ This accounting change did not for the most part fundamentally change the principles on which the accounts were prepared and a special provision recognising the unique 'fund' basis of UK insurance resulted in there being no net effect on bottom line results, at least for traditional with-profits business (Horton and Macve, 1995).

ed to date i.e. related acquisition costs,⁴ so the NPV on inception is treated as being zero.⁵ Under MSSB, the initial capitalisation of acquisition costs reduces the new business strain. These 'deferred acquisition costs' (DAC) are amortised over the term of the contract, normally in proportion to premium revenue received or, in the case of unit-linked business, to fees earned on assets under management.⁶ However, MSSB still essentially requires excessive – albeit less excessive – conservatism in estimates about the future, which will unwind into profit releases (of both 'normal' profit and 'residual income', e.g. Ohlson, 1995) over the remaining policy life. So although under MSSB there is some mitigation of new business strain through DAC, users are still unable to see how current management is performing (as high profits may be the result of actions of previous management teams), which earnings relate to current performance (new business) and which relate to past performance, and what the drivers of profitability are.

3. Pressures for accounting change

Under the IAD, UK auditors were required, for the first time, to report on whether insurers' accounts give a true and fair view. This led to much debate in the UK over what further changes, if any, might be needed to meet this requirement, which in turn stimulated discussion of various forms of 'realistic' reporting for life insurance companies. Coupled with this new requirement there had also been other significant pressures for 'realistic reporting', for example the restructuring of the UK industry through takeovers and demutualisations. Such takeovers were not only by other insurers consolidating their position, but also increasingly by banks as part of a wider restructuring of the financial service industry. Managers thus felt pres-

sure to be able to report their performance more realistically so as both to demonstrate the return from the takeovers they had made and also to provide a defence against being taken over or, if taken over, against being marginalised in the new corporate structure. There was also widespread concern that listed life companies were undervalued by the stock market and in particular that the Pearl had been acquired cheaply by AMP in the hostile 1989 takeover. Salmon and Fine (1990) described various issues which had arisen in this hostile takeover, in particular the lack of published information about the 'realistic' value until it was too late for it to be accepted and understood by the investment community.

'The traditional method of accounting adopted by life insurance companies in the UK is recognised to provide an incomplete measure of annual profits. A more complete measure is known as embedded value profit, details of which will, in future, be published annually by Pearl.' (*Pearl Defence Document*, 1989)

4. Realistic reporting

4.1. Embedded values, accruals method, achieved profits and European embedded values

One striking feature of the international developments over the last two decades has been the emergence around the world of alternative reporting bases that aim to improve conventional life insurance reporting – itself largely rooted in requirements for statutory solvency reporting – by introducing 'value-based' approaches.

The Pearl takeover triggered a number of UK listed companies into publishing more realistic information on a regular basis. Some companies began reporting more systematic disclosure both of their 'embedded values' (incorporating the value for shareholders expected from the future releases of surplus from the life fund) and of results computed on the basis of the change in embedded value. Embedded value only values the existing (in-force) book of policies, not the value of expected profits on future business. A major component of the analysis of the change in EV from one year to the next is the value added by the new business written in the most recent year. Thus the embedded value effectively recognises the $NPV > 0$ (i.e. the present value of expected 'residual incomes') as a 'Day 1' profit on inception of the policy. As a result in subsequent periods, if initial expectations are realised, the only 'profits' reported will be 'normal profits' equal to the discount rate applied to the initial value ('unwind of the discount rate').⁷ The embedded value produced for supplementary reporting is generally calculated as a 'value in use' – and is the present value of the shareholders' interest in the 'in-force long-term business contracts'

⁶ Practices in Europe differ over what exactly can be deferred and by how long. During 2002 AEGON announced that 2002 earnings would be 30% to 35% lower than 2001 earnings. One of the reasons for this was that the company would accelerate the amortisation of the deferred acquisition cost asset.

⁷ If the discount rate is 'risk-free' rather than a 'risk-adjusted' discount rate ('RAD') – i.e. if all the risk factors are incorporated as 'margins' into the cash flow estimates – there will also be periodic profits representing releases from risk, which, together with the risk-free rate of return, will give 'normal profits'.

⁸ The determination of the value of in-force business involves, *inter alia*, the following steps: a) setting assumptions about future experience of the business block; b) projecting future insurance cash flows, future assets and investment income, future liabilities and future taxes in order to determine future operating earnings; c) projecting future required capital levels consistent with the above projections; d) determining future annual distributable profits from these projections and e) calculating the present value of those distributable profits at an appropriate discount rate.

('IFLTB')⁸ and the related shareholders' net assets of the in-force business, in other words the value to the shareholders of the in-force business if it continues to operate at its current level without material change (see O'Keeffe et al, 2005).

Although in any one year there is no direct relationship between MSSB accounting and embedded value accounting, because the profits on each basis relate to business written in differing time periods, the total profit shown under both bases will be the same over the term of each policy. The only difference is one of timing. EV recognises all of the present value of profit in the year the business is written, while under MSSB profits are deferred throughout the duration of each policy. In the initial growth phase of an insurer, one would expect there to be a lag effect such that EV profits are higher than MSSB profits. However, as an insurance business matures, MSSB profits should catch up with the EV profits.

The EV is thus seen as offering a number of advantages by providing *inter alia*: a more realistic alternative to MSSB accounting; valuable insights into the drivers of profitability, especially since it is consistent with management information and pricing; information on how current management is performing i.e., it facilitates communication of management actions to analysts that attempt to reflect their commercial reality; and information on the value that will emerge from business that has already been written.

However, the IAD did not specifically permit embedded value accounting and as a result most UK firms provided EV in their supplementary accounts, although the level of detail and disclosure differed considerably from company to company. Banking groups were not within the scope of the IAD, and continued to use embedded value in their primary financial statements under the banking exemptions from the normal Companies Act accounting requirements (e.g. Horton and Macve, 1995).

The Association of British Insurers (ABI) took up the mantle to develop a more realistic accounting approach that would fit within the constraints imposed by the conventional accounting framework. In 1990 the ABI proposed an alternative

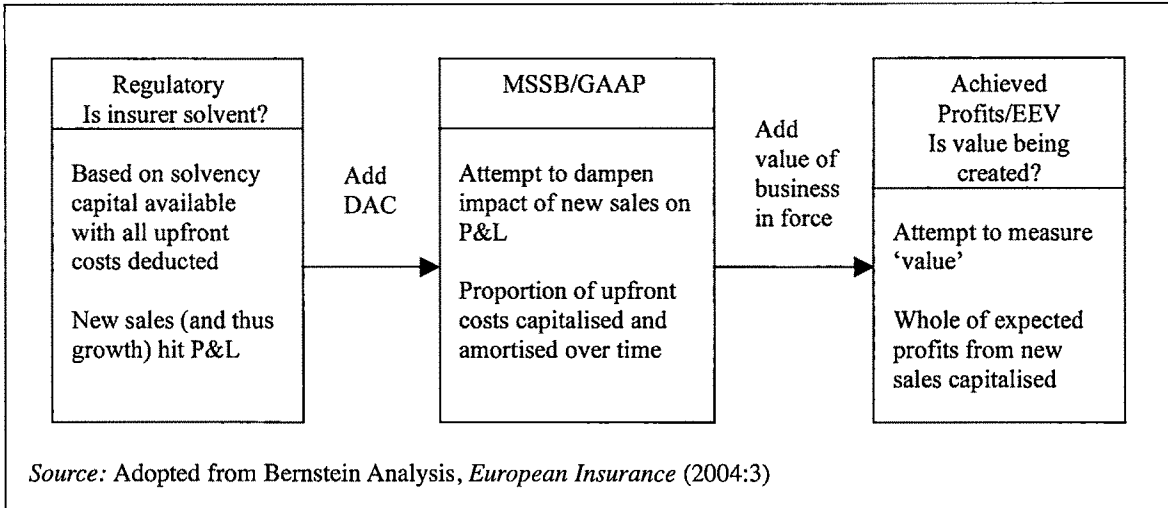
methodology of 'realistic' accounting – the 'accruals method' – that sought to apply the principles of the UK Accounting Standards Board (ASB)'s Statement of Standard Accounting Practice SSAP 9 *Accounting for Stocks and Long Term Contracts* to the insurance industry's long-term contracts and which it was thought would prove more acceptable for accounting purposes than the more actuarially driven 'embedded value' approach (see Horton and Macve, 2005). However, this approach did not receive the acceptance of the UK ASB as the primary reporting method.

Given this lack of acceptance by the ASB, coupled with many life insurers requesting that their EVs be audited, the industry realised that a framework needed to be developed that would provide more consistency and a transparent methodology, in particular in relation to the assumptions used e.g. the risk discount rate. This led to the ABI (2001) guidance, entitled *Supplementary Reporting for Long Term Insurance Business (the Achieved Profits Method)*. This guidance was optional, but in practice nearly all the listed UK insurance companies adopted it, using embedded value methodology. It was recognised that a minimum level of disclosure was required and over the last few years consistency has increased not only with respect to methodology and disclosure but also because there now appears to be convergence of the economic assumptions, which include the discount rate (see discussion below: CFO Forum, 2004). However, with this increased disclosure, and hence attention, a number of problems with traditional EV methodology have emerged, in particular issues relating to allowing for risk and reflecting the impact of options and guarantees. Given that earnings are sensitive to the assumptions employed, there was concern over the inconsistencies in assumptions between companies and also some lack of adequate disclosure. These concerns highlighted the fact that the EV methodology employs only one discount rate and this may not be appropriate given that the different products sold by insurers/bancasurers have different risk profiles. It was also noted that EV did not address the time value of options and guarantees explicitly.

Consequently, in 2004 a number of leading European insurers, collectively known as the 'CFO Forum', grouped together to jointly release a document entitled *European Embedded Value Principles* (EEV). The intention of the document was to provide a voluntary set of principles for reporting supplementary EV information that would be adopted by the chief financial officers of 19 major⁹ European insurers. All CFO Forum members agreed to adopt EEV from no later than 2005.¹⁰ Although the principles had been derived for the European insurance market, the presence of many European insurers in the Asia Pacific region

⁹ By premium income and assets.

¹⁰ In the UK Aviva plc announced (on 6 January 2005) the adoption of EEV from 2004 for its supplementary reporting, which apparently was associated with a favourable share price reaction for the sector on 7 January 2005 (Independent Newspaper, 7 January 2005). On 9 March it released its preliminary results for 2004 incorporating the EEV numbers. Aegon, Allianz, ING, Legal & General, Old Mutual, Prudential and Skandia published their year-end 2004 embedded values using methodologies and assumptions consistent with EEV Principles. Riunione Adriatica di Sicurtà S.p.A (RAS) become the first Italian group and the first non-CFO Forum company to publish its EV using EEV principles.



is likely to encourage the development of such practices across other insurers in the region. The document does not radically change the traditional EV methodology (still a principles-based rather than a rules-based approach), but attempts to address a number of criticisms of previous EV practice. In particular, the lack of consistency in methodology, assumptions and disclosure practices, and the approach taken to value guarantees and options.¹¹ The CFO Forum acknowledged that historically the selection of EV discount rates has left significant room for judgment, which appears to have led in practice to a 'herding' tendency, and it called on all companies to apply and communicate a more rigorous and active approach to linking risks with discount rates.

In general terms, the EEV principles provide a common framework for incorporating an allowance for the risks inherent in insurance contracts in determining the value of future cash flows from in-force long-term business. The principles also provide a common standard for disclosure of the EEV results, basis of preparation, and sensitivities. Companies, though, are allowed a degree of flexibility as to the types of business valued under EEV principles, and the determination of the precise allowance for risk is at the companies' discretion rather than being dictated through a set of detailed rules. EEV disclosures in turn reflect information used for internal management and control (e.g. Goford, 1985).

'The key decision facing companies in implementing EEV is how to allow for risk, through a combination of discount rate, the allowance for

options and guarantees and the cost of holding prudential reserves and required capital. The EEV principles compel companies to give these decisions active consideration and justification and this is to be welcomed.' (Towers Perrin, Tillinghast, *Update*, June 2005)

In summary, there are three¹² accounting systems for UK insurers. At one extreme, the traditional statutory numbers test the insurers' regulatory solvency, crucial to their ability to stay in business and grow. At the other end is EEV, which measures the present value of the cash flows coming into the insurer from in-force business, and by extension the value being created. In the middle are the IFRS MSSB numbers which capitalise some of the costs (see above).

4.2. Realistic reporting and accounting standard-setters

The IASB is engaged on a joint project with FASB on accounting for insurance contracts, which was begun by its predecessor the IASC in 1997, leading to the publication of an 'issues paper' in 1999 (IASB, 1999) and exposure of a *Draft Statement of Principles (Insurance)* (DSOP) in 2001 (IASB, 2001).¹³ The IASB heads the project which was subsequently split into Phase I and Phase II in order that some (limited) improvements could be implemented in Phase I in time for the deadline of the adoption of international accounting standards for listed companies by the European Union, with effect from 1 January 2005.

'There remains no consensus on an appropriate longer term basis for reporting for insurance in companies' main financial statements. Consequently, for 2005 and the immediate future, companies' statutory basis results will reflect the compromise Phase I requirements of the International Accounting Standards Board (IASB).' (J. Bloomer, Prudential's CEO, 2005:101)

¹¹ The main change from traditional EV practice is that the costs of all financial guarantees and options must be explicitly valued and deducted from the value of in-force business.

¹² Ignoring taxation accounts, which are based on the solvency returns.

¹³ The DSOP is incomplete and was not endorsed by the Board.

The IASB issued IFRS 4 *Insurance Contracts*, in March 2004, which represented the completion of 'Phase I' of the project. Here the standard imposes only limited requirements and by and large leaves existing practices – in all their variety – unchanged. Until Phase II is completed, insurers may generally continue their existing accounting policies for insurance contracts and are exempt from applying the criteria in IAS 8 *Accounting Policies, Changes in Accounting Estimates and Errors* that entities normally have to apply for developing an accounting policy where no IFRS applies specifically to an item. IFRS 4 represents a temporary mechanism for accommodating current GAAP accounting for most insurance contracts. The major issues that have held up progress and have now been postponed to Phase II are those relating to life insurance, and in particular, *inter alia*, the issues relating to the fair value of long-term insurance contracts (including the timing of recognition of profit), the treatment of 'deferred acquisition costs', and the acceptability of 'embedded values'. In short, after some 10 years of deliberation, almost all of the key underlying conceptual issues are still to be resolved.

Of potentially greater significance are the provisions that circumscribe the use of 'embedded values' in the main financial statements. Currently UK insurers are forbidden to do so by the ABI Statement of Recommended Practice (SORP) (at the behest of the ASB), while other entities such as banking groups (and Irish insurers) do have freedom to include their insurance activities on this basis. IFRS 4 does not require an entity that is currently using embedded value to abandon it or to change the methodology used: but it limits the extent to which companies can change to using embedded values in two ways. It prohibits a change of accounting policy for insurance contracts that involves measuring contractual rights to future investment management fees at an amount that exceeds their fair value implied by a comparison with current fees charged by other market participants for similar services. It introduces a rebuttable presumption that an insurer's financial statements will become less relevant and reliable (and therefore the change cannot be made) if it introduces an accounting policy that reflects future investment margins in the measurement of insurance contracts. Some present embedded value methodologies include these features, and therefore companies using them would not generally be able to start introducing embedded values into their main accounts. However, the recent EEV methodology addresses at least the second of these features. Subject to clarification of the treatment of future investment management fees it will therefore be possible, at least during Phase I, for companies to incorporate embedded values on this

basis into their main accounts. The IASB has indicated that in Phase II it may not accept methods that give rise to a profit on the inception of a contract unless there is strong market-based evidence for this.

In the US, there is widespread acceptance that the current package of GAAP for insurance business that has accumulated over the last 20 years or so is no longer adequate – especially since the implementation of Statement of Financial Accounting Standard SFAS 115 in 1993 – and that life insurance earnings under US GAAP are therefore of low quality (e.g. Horton and Macve, 1995; Upton, 1996; Wilkins, 1998; c.f. O'Keeffe and Sharp, 1999; Abbott, 1999; FASB, 1999). The FASB appears to accept that the current US GAAP for insurance are overdue for comprehensive overhaul and is now therefore monitoring the IASB's progress on the joint project. The American Council of Life Insurers (ACLI), in collaboration with Ernst & Young, has researched the use of EVs by American insurance companies. They found that the embedded value has grown in popularity in the US for a number of reasons (Ernst & Young, 2004):

- a) the desire for improved management information;
- b) lack of relevant information from US GAAP: for example, analysis of earnings by source based on US GAAP is a complex task, whereas EV illustrates the short-term and long-term effects of changes in each key profit driver;
- c) the rating agencies have increased their information requests in an effort to better understand fluctuations and trends in companies' financial results and increase the transparency of companies' financial statements and their comparability between companies and across industries;
- d) investors are echoing the demands of regulators and rating agencies, calling on companies to disclose more information, both financial and non-financial.

4.3. Realistic reporting: market reactions

'Existing insurance accounting focuses more on the needs of prudential regulators than on the information needs of investors. As a result, the true and fair financial statements are not very good at providing shareholders with useful information about the value of their interests in the business.' (ASB, 2004: FRS 27 comments (Appendix 4: para. 7.4))

As noted already, embedded value reporting appears to have grown in popularity with analysts and preparers in inverse proportion to its accept-

ability to accounting standard-setters. Horton and Macve (1997) conducted interviews with, *inter alia*, analysts and preparers and concluded that EVs provide the information that is most valued by analysts. The CFO Forum notes that EVs provide information relevant to shareholders' value that is not provided by traditional accounting, since it is consistent with management information and pricing and facilitates communication of management actions to the market that reflect their commercial reality. This is despite these numbers being relegated to supplementary information. Indeed anecdotal evidence suggests EVs are the dominant valuation method used by the investment community, and 33 investment banks out of a sample of 37 employ EV.¹⁴

'Given the plethora of measures, it is important to understand which are the most important! For the leading UK insurers, it is the Embedded Value. Their [UK insurers] solvency is strong enough that they pass that hygiene factor, and investors tend to prefer the EV measure to the 'official' MSSB when looking at valuation.' (*Bernstein Research Call*, October 2004)

Credit Suisse states '...we focus on embedded value (EV) in our valuation approach for the sector and the stocks, as does the market',¹⁵ although they go on to say that, while the IFRS numbers do not drive their valuation, 'it is also important, in our opinion, to look at P/E multiples of stated IFRS or GAAP earnings, which are the closest measure of "cash earnings" that we have in the sector.'

'...it is important not to ignore IFRS profit. Although these profits contain a large intangible element (mainly through the deferral of acquisition costs, or DAC), they are probably a better indicator of current cash generation than the embedded value'. (Credit Suisse First Boston, *Equity Research*, July 2005:32)

Deloitte (2005) notes that, for US firms, analysts would begin to ask for their internal EV measures within the next three years, especially given that the trend towards harmonisation of accounting standards means Europeans adoption of EV is like-

ly to spread around the globe. Thus it will become increasingly difficult for the remaining North-American companies to resist providing EV information in their financial statements.

However, analysts do not appear to accept the EV reported by the companies at 'face value' and many adjust the assumptions, and in particular the discount rate.

'A major risk in the context of embedded value, when issuers are capitalising future cash flows they have not yet received, is 'assumption risk'. This risk that economic and operational assumptions used to measure profitability may not be experienced in practice.' (Credit Suisse First Boston, *Equity Research*, July 2005:32)

Note that JP Morgan in 2004 changed its valuation driver from EV to MSSB on the grounds that EV 'are highly reliant on assumptions that we find too optimistic'.¹⁶ Following the introduction of EEV the market reaction has appeared to be positive with the view that EEV provides a significant step forward in improving consistency, transparency, and comparability. PricewaterhouseCoopers (2005) conducted a survey of analysts¹⁷ and found that more than 60% of the analysts rated the adequacy of European insurers' financial reporting as 'poor'. Less than 10% felt that it was good. Nearly 80% felt EEV is more useful than IASB's 'Phase I' (IFRS 4) and almost all analysts believed EEV will improve the comparability of European life company accounts. Indeed, the majority of analysts also believed that they are beginning to favour EEV over 'fair value'.¹⁸ However, the discussions revealed some reservations about how EEV will be applied in practice, and underlying this was a certain level of scepticism about both IFRS 4 numbers and EEV. PwC quotes one analyst as saying:

'...companies always seem to arrive at the same number whatever the basis for evaluation'.

It was noted that nearly 20% of the analysts believed that insurers' EVs will stay the same despite the modifications of EEV. Bernstein Analysis (2004) notes that the main effect of the IFRS change has been in the expense incurred by companies, since the combination of a series of accounting changes in implementing the full range of IFRS has put a strain on the finance departments that they believe cost tens of millions of pounds. Under IFRS, the published annual reports and accounts will roughly double in size, with the addition of both the required and any optional disclosures. Bernstein also believes 'while the overall numbers will be unaffected, the accounts will look very different' and that:

'It remains to be seen whether the analysts union (the Union of General and Life Insurance

¹⁴ The four investment banks that currently do not employ EV in their valuation methods are Dexia (Paris), JP Morgan (UK), KBC (Brussels) and WestLB (Germany).

¹⁵ Credit Suisse First Boston, *Equity Research* July 2005. Credit Suisse's valuation approach is based on a sum-of-the-parts valuation model for each stock. This is based on estimating sustainable return on capital/embedded value of each division in a group and applying appropriate multiples to allocated capital. This is consistent with other investment banks.

¹⁶ See footnote 14 above.

¹⁷ Analysts interviewed consisted of 50 buy and sell side insurance analysts based across Europe.

¹⁸ Although the difference between EV and FV was not clearly defined.

Analysts, or UGLIA for short) will resort to direct action in protest at this new burden.'

Following this background, the remainder of this paper sets out the empirical testing undertaken and its results. It is structured as follows: first, an explanation of the research hypotheses; next, a description of the research design and methodology used to test value relevance, followed by the sample and descriptive statistics, and then the results from the various models. Last, I comment on some possible implications of these results for standard-setters (in particular the IASB and the FASB in the conduct of their joint Phase II insurance project) and for the industry.

5. Hypotheses

Given the differing views of the usefulness of the different types of accounting information available to users, and in particular the issues relating to the reliability and relevance of the 'realistic' numbers reported by companies, the following hypotheses are tested:

H₁: The 'Realistic Reporting' disclosures are value-relevant to the market value of the firm's equity.

H₂: The 'Realistic Reporting' disclosures are incrementally value-relevant over the modified statutory solvency basis ('MSSB') earnings and accounting book values.

Realistic reporting disclosures are controversial and this might suggest they are not reliable, yet I find that they are value relevant. Value relevance implies that realistic reporting is not totally unreliable. Kallapur and Kwan (2004) investigated *inter alia* the reliability of brand capitalisation by firms. They investigated the difference in brand capitalisation rates of firms with strong and weak contracting incentives and found that brand asset measures might not be reliable. Given that my sample is industry specific and the fact that all insurance companies disclose, in some form or another, realistic reporting, it would be difficult to test differential reliability any further. As discussed above, anecdotal evidence does suggest that certainly the ASB, IASB and some analysts do not believe the numbers are particularly reliable, albeit that they are relevant in principle.

6. Research design and methodology

6.1. Value relevance of realistic reporting

In order to test hypotheses 1 and 2, I need to ascertain whether the market value (stock price) reflects the incremental information contained in the realistic reporting accounting disclosures over and above the Modified Statutory Solvency Basis ('MSSB') accounting numbers for life insurance

and bancassurance firms. Previous value-relevant studies such as Dechow et al. (1999), Barth et al. (2001), Graham et al. (2003) and Kallapur and Kwan (2004), have applied the well-known work of Ohlson (1995). However, unlike these previous studies, this study suffers from an extremely small sample size, since the UK insurance industry currently only contains eight life insurance companies, which therefore limits the model specifications and introduces potentially numerous econometric issues. To limit some of these econometric issues I employ both parametric and non-parametric tests.

6.2. Parametric tests

The Ohlson model does provide a framework within which to examine the value relevance of life insurance reporting, in that it relates the value of the firm to the information provided in both the income statement and balance sheet together with any other value relevant information.

Consequently, I test the value relevance and incremental information content of the 'realistic reporting' by investigating the changes in explanatory power from the basic model, which regresses the market value of equity on book value of equity and net income (both valued using the modified statutory solvency basis (MSSB)), to the full model, which in addition includes the realistic reporting asset – 'additional value of in-force long-term business' (*IFLTB*) and the achieved life profits (*APLFBT*). Both models use pooled annual time-series and cross-sectional data for all sample firm-years. I estimate the following regressions:

$$MVE_{it+3mths} = \alpha_0 + \beta_1 MSSBK_{it} \quad (\text{Basic Model 1}) \\ + \beta_2 MSSERN_{it} + \varepsilon_{it},$$

$$MVE_{it+3mths} = \alpha_0 + \beta_1 MSSBK_{it} \quad (\text{Full Model 1}) \\ + \beta_2 MSSERN_{it} \\ + \beta_3 IFLT B_{it} \\ + \beta_4 APLFBT_{it} + \varepsilon_{it},$$

where:

- MVE* = market value of equity;
- MSSBK* = book value of equity valued under MSSB;
- MSSERN* = net income (both life and non-life business) valued under MSSB;
- IFLTB* = the additional present value of the in-force long-term business;¹⁹
- APLFBT* = the achieved profits before taxation for the life insurance business (i.e. not including non-life business profits).²⁰

¹⁹ *IFLTB* is incremental to *MSSBK*, and does not represent *MSSBK* plus an adjustment. In any one year there is no direct relationship between *MSSB* accounting and embedded value accounting, because, as stated earlier the profits emerging on each basis relate to business written in differing time periods.

²⁰ Footnote also 19 holds true for *APLFBT*.

Consistent with the suggestions of Barth and Kallapur (1996), both equations are estimated un-deflated with White's (1980) correction for heteroskedasticity. However, in order to test the robustness of my results to alternative specifications, I also estimate the models using the number of shares outstanding as a deflator (i.e. a price-per-share specification). Given the suggestion noted in Barth et al. (1996), I also re-run the models with a separate variable to proxy for scale – number of common shares outstanding.²¹ However, the re-

²¹ Additional deflators were also used – market value of equity at the beginning of the fiscal year, share price at the beginning of the fiscal year – but the results were not materially different and hence are not reported here.

²² I also augment the above models to control for cross-sectional differences that have been shown to affect the relative roles of earnings and book values in explaining stock price. For example, Barth et al. (1999) control for firms' growth as this may also affect the relative role of earnings in determining stock price. Similarly Collins et al. (1999) found evidence of smaller net income pricing multiples for loss-making firms. Thus we include additional dummy variables SIZE, GROWTH and LOSS. The first two are indicator variables that equal one if the firm has market capitalisation and growth in the book value of equity above the sample median, and zero otherwise, and LOSS is an indicator variable that equals one if the firm has negative net income and zero otherwise. The results post-inclusion of these additional variables were not significantly different from those pre-inclusion for the variables of interest and therefore are not reported here. In addition, all the models reported above were also rerun to control for fixed year effects, similar to Kallapur and Kwan (2004). We included a dummy variable to control for these effects. If correlated with the independent variables these effects could otherwise bias the regression coefficients. Even if uncorrelated, the effects could still bias the t-statistics by inducing contemporaneous cross-correlation of residuals. Thus each equation had the additional variable included

$$\sum_{i=0}^{t-03} \alpha_i YRDUM_i$$

where *YRDUM* is a dummy variable equalling 1 if the year is *t* and 0 otherwise. The results for all the models post inclusion were qualitatively unchanged, and therefore are not reported here.

²³ It can be noted that because all other variables are measured as of 31 December in year *t*, using 31 March in year *t+1* market prices may add noise to my tests. The models were rerun using year-end market values and the results were similar – all coefficients had exactly the same signs, although the significances of the 'realistic reporting' disclosures, albeit still significant, were less.

²⁴ An additional market-adjusted return was calculated to remove the effects of industry-wide events from the returns measure, by also removing the industry index, which represented the equally weighted return for all sample life firms. The results were not materially different and thus are not reported.

²⁵ Cumulative Abnormal Returns were also calculated by accumulating weekly prediction errors from the market model over the accounting year. The independent variables were deflated by the market value of equity at the beginning of the accounting year to control for differences in firm size that could result in heteroskedasticity. The market model parameters were estimated for each firm using weekly data from the 50 weeks preceding the test year and the FTSE-All Share Index. The results were not significantly different from those using the market-adjusted returns and so only the latter results are reported.

sults are not materially different and the coefficient of the proxy for scale is not found to be significant.²²

If 'realistic reporting' has value relevance then the change in the explanatory power from the basic model to the full model should be positive and significant. This significance would indicate that the realistic reporting is associated with market values after controlling for book value and net income reported under MSSB. Given the econometric issues associated with my small sample size, I measure value relevance based simply on the increased overall explanatory power of the 'realistic accounting' with respect to prices. For example, Collins et al. (1999) and Francis and Schipper (1999) both rely on *R*² in making inferences regarding changes in value relevance over time.

A number of studies have either used the firm's accounting year-end for time *t*, or three months after the accounting year end *t+3mths*. Similar to Graham et al. (2003), market prices as of 31 March in year *t+1* are used because all the firms included in this study have the same accounting year-end (which ensures uniform disclosure of both MSSB accounting and of realistic reporting in each year, (Berry and Wright, 2001)) and the realistic reporting disclosures are not likely to be made until their preliminary earnings announcements and/or detailed information is released in their annual reports.²³

While the price model is widely accepted as an appropriate methodology for testing the value relevance of financial information, many researchers continue to use a cumulative returns methodology in addition to the price model. Consequently, in a manner similar to the tests above, I also test the value relevance of the 'realistic reporting' numbers using a returns specification. Starting with the price regression and then taking the first difference and deflating by beginning of period price I thus estimate the following basic and full returns regressions:

$$RTN_{it+3mths} = \alpha_0 + \beta_1 MSSERN_{it} \quad (\text{Basic Model 2}) \\ + \beta_2 \Delta MSSERN_{it} \\ + \epsilon_{it},$$

$$RTN_{it+3mths} = \alpha_0 + \beta_1 MSSERN_{it} \quad (\text{Full Model 2}) \\ + \beta_2 \Delta MSSERN_{it} \\ + \beta_3 APLFBT_{it} \\ + \beta_4 \Delta APLFBT_{it} \\ + \epsilon_{it},$$

where:

$RTN_{it+3mths}$ = is the 12-month compound daily market-adjusted return,²⁴ beginning nine months prior to the accounting year-end and ending the third month following the firm's accounting year-end;²⁵

$\Delta MSSERN_{it}$ = the annual change in MSSB (i.e. 'GAAP') income, i.e. $MSSERN_{it} - MSSERN_{it-1}$;

$\Delta APLFBT_{it}$ = the annual change in the achieved life profits (before tax), i.e. $APLFBT_{it} - APLFBT_{it-1}$.

All other variables are as previously defined.

Both the earnings level and earnings change are included in the above models following the findings of Easton and Harris (1991), who found that both aspects of earnings are relevant for explaining returns and are not just substitutes.²⁶

6.3. Non-parametric tests

I also investigate the correlation structures between the dependent and each of the independent variables. The individual observations are ranked into two ordered series and then their level of association is tested via the Spearman rank and Kendall tau²⁷ tests. If the independent variables are value relevant, in terms of their association with price or returns, then I would expect the level of association to be significantly different from zero.

7. Sample and descriptive statistics

7.1. Sample selection

The sample consists of all UK publicly traded insurance companies and banks that conducted life insurance business, and disclosed embedded value to measure their 'achieved profits' during the period 2000 to 2004. I manually extracted the accounting numbers, including the achieved profits results

and embedded values, directly from the firms' own annual reports because these values are not separately reported in any available database. I obtained stock prices from Datastream. My sample includes eight life insurance firms²⁸ and two bancassurers.²⁹

I also examined the financial statements to determine the firms' 'realistic reporting' methodology as well as their disclosure policy (see Table 1).

The majority of firms used the modified statutory solvency basis (MSSB) in their main accounts and then provided supplementary information, initially in 2000 based on ABI Guidance notes issued in 1999, and then using the Achieved Profits methodology (ABI, 2001) in 2001 onwards. The exceptions to this were three of the life companies – Aviva plc, Countrywide Insurance, and St James's Place – and both bancassurers. These three life insurance companies included in the balance sheet in their main accounts, prior to 2002,³⁰ the 'present value of in-force long-term business' (*IFLTB*) and, except for Aviva, the change in the *IFLTB* was also included in the profit and loss account in the main accounts. After 2002, the companies removed the *IFLTB* and the change in *IFLTB* from their main accounts and disclosed it purely as supplementary information. The main reason given for such a change was due to the firms adopting FRS 18: *Accounting Policies* (ASB, 2000).³¹ As a result, the firms adopted the recommended practice on accounting for life insurance business under which the ASB had not allowed this value to be recognised in the main accounts. Both bancassurers continued to recognise the *IFLTB* and change in the *IFLTB* in their main accounts, with disclosure of the MSSB life profits in the notes (from 2002 onwards).

The first UK firm to disclose the European Embedded Value (EEV) in their 2004 accounts was Aviva plc.

In Table 2, I present financial data for the sample firms. The present value of internally generated in-force long-term business (*IFLTB*) is substantial relative to the book value of shareholders' equity under the MSSB methodology with an overall median of 63% of the MSSB amount (including banks) and 70% (excluding banks). It may be noted that the Britannic Insurance plc's market-to-book ratio under the realistic reporting method is 0.85: this may be due in part to the fact that Britannic is a closed fund i.e. closed to new business. Theoretically, the market value of a closed fund (i.e. where there is no value of anticipated future new business) should be 100% of the EV. Further investigation is needed to understand whether this difference is due a) to measurement error in the embedded value disclosed by Britannic, e.g. issues about valuation of options and guarantees

²⁶ Ali and Zarowin (1992) note that the explanatory power of the earnings level is consistent with the presence of transitory components of annual earnings, hence earnings level acts as an additional proxy for unexpected earnings when the previous period's earnings are not purely permanent, and thereby contributes to the explanatory power of the unexpected earnings-abnormal returns model.

²⁷ In addition, we also calculated the coefficient Gamma but the results were identical to the Kendall tau and are therefore not reported.

²⁸ 10 life insurance firms were listed on the Stock Exchange as of 31 December 1999. However, three of these firms were delisted during the 2000 period. One firm was added during 2001, Friends Provident.

²⁹ 10 banks were listed on the Stock Exchange as of 31 December 1999. Of these, only six conducted life insurance directly and of those only two reported the data required for the analysis for the periods 2002 to 2004.

³⁰ Aviva included *IFLTB* in their 2002 accounts also.

³¹ FRS 18 deals primarily with the selection, application and disclosure of accounting policies. Its objective is to ensure that for all material items an entity adopts the accounting policies most appropriate to its particular circumstances for the purpose of giving a true and fair view; that the accounting policies adopted are reviewed regularly to ensure that they remain appropriate and are changed when a new policy becomes more appropriate to the entity's particular circumstances; and that sufficient information is disclosed in the financial statements to enable users to understand the accounting policies adopted and how they have been implemented (ASB, 2000).

Table 1
Accounting methodology reported by firms in their main accounts and in any supplementary accounts

Name	Year	Main accounts		Supplementary accounts	
		Balance sheet	Profit & loss	Balance sheet	Profit & loss
Aviva	2000	MSSBK + IFLTB	MSSERN	N/A	MSSERN (NL) + AP ^b
	2001	MSSBK + IFLTB	MSSERN	N/A	MSSERN (NL) + AP ^c
	2002	MSSBK + IFLTB	MSSERN	N/A	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^d	MSSERN (NL) + AP ^d
Britannic	2000	MSSBK	MSSERN	APBK ^b	MSSERN (NL) + AP ^b
	2001	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2002	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
Countrywide Insurance	2000	MSSBK + IFLTB	MSSERN + AP ^b (LF)	Notes: MSS	Notes: MSS
	2001	MSSBK + IFLTB	MSSERN + AP ^b (LF)	Notes: MSS	Notes: MSS
	2002	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
Friends Provident	2001	MSSBK	MSSERN	APBK ^b	MSSERN (NL) + AP ^b
	2002	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
HBOS	2002	MSSBK + IFLTB	MSSERN + AP ^b (LF)	N/A	MSSERN (LF) – notes
	2003	MSSBK + IFLTB	MSSERN + AP ^c (LF)	N/A	MSSERN (LF) – notes
	2004	MSSBK + IFLTB	MSSERN + AP ^c (LF)	N/A	MSSERN (LF) – notes
	2004	MSSBK	MSSERN	APBK ^b	MSSERN (NL) + AP ^b
Legal & General	2000	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2001	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2002	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
Lloyds TSB	2002	MSSBK + IFLTB	MSSERN + AP ^b (LF)	N/A	MSSERN (LF) – notes
	2003	MSSBK + IFLTB	MSSERN + AP ^c (LF)	N/A	MSSERN (LF) – notes
	2004	MSSBK + IFLTB	MSSERN + AP ^c (LF)	N/A	MSSERN (LF) – notes
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c

Table 1
Accounting methodology reported by firms in their main accounts and in any supplementary accounts (continued)

Name	Year	Main accounts		Supplementary accounts	
		Balance sheet	Profit & loss	Balance sheet	Profit & loss
Old Mutual	2000	MSSBK	MSSERN	APBK ^b (LF)	AP ^b
	2001	MSSBK	MSSERN	APBK ^b (LF)	AP ^b
	2002	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
Prudential	2000	MSSBK	MSSERN	APBK ^a	MSSERN (NL) + AP ^a
	2001	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2002	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
St James's Place	2001	MSSBK + IFLTB	MSSERN + AP ^b (LF)	N/A	N/A
	2002	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2003	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c
	2004	MSSBK	MSSERN	APBK ^c	MSSERN (NL) + AP ^c

MSSBK = Total shareholders equity on the modified statutory solvency basis (MSSB);

MSSERN = Net income valued on the modified statutory solvency basis; MSSERN (NL) = Non-life income valued on the modified statutory solvency basis; MSSERN (LF) = Life income valued on the modified statutory solvency basis; IFLTB = In-force long-term business; AP = Life insurance income using the ABI Guidance (see below); APBK = Total shareholders equity valued using the ABI Guidance (see below), APBK(LF) = Shareholders equity of the life business using the ABI Guidance (see below); ^a = ABI Guidance July 1995; ^b = 'Guidance on accounting in group accounts for proprietary companies long-term business' circulated by the Association of British Insurers, 1999; ^c = 'Supplementary reporting for long-term insurance business (the achieved profits method), circulated by the Association of British Insurers in December 2001; ^d = European embedded value (EEV) principles introduced by the CFO Forum in May 2004.

Table 2

Descriptive statistics (number of observations, median and range (in parenthesis)) for UK insurance and bancassurance firms disclosing balance sheet and profit and loss items based on the 'realistic reporting' and 'modified statutory solvency basis' (MSSB) methodologies by firm and their market capitalisation (MVE)

Firm name	N	Accounting periods	Balance sheet			Profit and loss account			
			MVE £'000	MSSBK £'000	IFLTB £'000	IFLTB/ MSSBK	MSSERN £'000	APLFTB £'000	APBT/ MSSERNBT
Aviva	5	2000–2004	14,500,000 (27,594,300)	6,613,000 (2,568,000)	4,875,000 (2,141,000)	0.72	16,000 (2,764,000)	1,151,000 (3,606,000)	1.49
Britannic Insurance ^a	5	2000–2004	925,170 (1,201,460)	760,000 (611,300)	287,000 (210,300)	0.28	44,100 (297,000)	65,500 (231,800)	1.37
Countrywide Insurance ^b	5	2000–2004	521,210 (336,260)	96,203 (71,083)	135,960 (80,814)	1.19	48,301 (51,817)	–2,986 (85,841)	0.74
Friends Provident	4	2001–2004	2,919,100 (2,017,440)	2,095,000 (563,000)	1,272,500 (435,000)	0.60	101,000 (258,000)	–18,500 (1,092,000)	1.25
HBOS	3	2002–2004	28,450,000 (7,741,590)	14,250,000 (3,502,000)	3,950,000 (882,000)	0.28	2,144,000 (935,000)	525,000 (481,000)	1.13
Legal & General	5	2000–2004	7,368,000 (3,825,650)	3,187,000 (614,000)	2,232,000 (863,000)	0.72	317,000 (655,000)	281,000 (1,497,000)	1.89
Lloyds TSB Group	3	2002–2004	23,130,000 (8,774,070)	7,377,000 (2,104,000)	2,904,000 (60,000)	0.39	2,401,000 (1,499,000)	453,000 (1,018,000)	1.01
Old Mutual	5	2000–2004	3,875,300 (2,390,840)	2,863,000 (1,148,000)	823,000 (258,000)	0.24	273,000 (729,000)	223,000 (2,956,000)	0.77
Prudential	5	2000–2004	12,020,000 (8,724,370)	3,950,000 (1,003,000)	4,200,000 (1,285,000)	1.06	428,000 (480,000)	683,000 (2,354,000)	0.77
St.James's Place	4	2001–2004	925,980 (824,980)	203,500 (42,100)	349,950 (130,300)	1.89	8,465 (81,200)	92,950 (77,500)	4.70
Median	44		4,850,000 (31,975,900)	3,023,500 (16,153,344)	1,407,500 (5,975,028)	0.63	107,090 (4,945,000)	113,750 (4,319,000)	1.10
Range			3,772,500 (21,642,900)	2,616,000 (8,248,344)	965,500 (5,975,028)	0.70	47,800 (2,764,000)	87,900 (4,319,000)	1.13
Median (excl. banks)	38								
Range (excl. banks)									

For Friends Provident this company was not listed until 2001; HBOS and Lloyds TSB did not report modified statutory solvency numbers until 2002; ^a = now known as Resolution; ^b = now known as Chesnara plc; MVE = market value of equity; MSSBK = book value of shareholders' equity valued under the modified statutory solvency basis; IFLT B = the additional present value of the in-force long term business; MSSERN = net income (both life and non-life business) valued under the modified statutory solvency basis; MSSERNBT = MSSERN before taxation; APLFTB = the achieved profits before taxation for the life insurance business (i.e. does not include non-life business profits), many of the firms did not disclose the total life business profit after tax or provide enough disclosure to calculate it; APBT = total achieved profit before tax i.e. including non-life business profits.

or b) to the consequences of moving from valuing the in-force book within the context of an ongoing business whose activities, expenses etc. are shared with the generation of new business, or c) to the effect of other market factors, such as the terms on which takeover deals are struck and the relative power of the buyer and the seller in a thin market.

The 'realistic reporting' total income known as 'achieved profits' – (i.e. including both life and non-life business profits, in this case before taxation) (*APBT*) – is relatively higher generally than total income (before taxation) reported under MSSB (*MSSERNBT*) with an overall median relative value of 110% (including banks) and 113% (excluding banks).

7.2. Descriptive statistics

Descriptive statistics are presented in Table 2. Table 2 shows that the median in-force long-term business (*IFLTB*) is approx £1,408m (excluding the banks – £966m) – the highest median value was that of Aviva plc at approx £4,875m and the lowest was that of Countrywide Insurance plc at approx £136m. Similarly, the median book value of shareholders' equity under the MSSB method (*MSSBK*) is £3,024m (excluding the banks' £2,616m) – the highest median value was that of the bank HBOS at £14,250m and the lowest was that of Countrywide Insurance at £96m.

The median life profits reported (before tax) under the 'realistic reporting' regime (*APLFBT*) is approximately £114m (excluding the banks' £88m) – the highest median value was that of Aviva at £1,151m and the lowest median value was that of Friends Provident plc at a negative £18.5m. The median net income for the year under MSSB (*MSSERN*) is £107m (excluding the banks' £48m) – the highest median value (excluding the banks) was that of Prudential at £428m and the lowest was that of Aviva at £16m.

8. Results

8.1. Non-parametric results

Table 3 presents the measures of association between the ranked dependent and independent variables used in the regressions. In Panel A and Panel C the level of association between the market value of equity (*MVE*) and all the ranked independent variables for all years 2000–2004 is significantly positive at the 0.1% level under both the Spearman rank and Kendall tau tests, with the exception of achieved profits (*APLFBT*) which has a significance level only at 2%. For each individual year, the significance of the in-force long-term business (*IFLTB*) and the book value under MSSB is consistent at 2% or above. This is not the case for either the earnings under MSSB or the achieved profits (*APLFBT*). Removing the bancassurers from the sample re-

sults reduces the level of association for the earnings under MSSB to 2% (see Panels B and D). All other associations remain at the same level of significance, as with the full sample. These relationships are also maintained for variables on a per-share basis (see Panels A to D) for all years 2000–2004.

It appears from these first results that the realistic reporting disclosures are value relevant and therefore Hypothesis 1 appears to be supported. This is especially true for the in-force long-term business asset (*IFLTB*), which appears to have a very significant and robust association with both market value and price-per-share.

8.2. Parametric results

The results for equations Basic Model 1 and Full Model 1 are reported in Table 4. Following Belsley et al. (1980) *DFBETAS* were estimated to ascertain whether there were outliers driving the results – one outlier was identified and deleted from the sample, however the results of the variables of interest post-deletion were qualitatively unchanged.

The overall adjusted R^2 for the full model was approximately 90% for the full sample and 93% for the life sample respectively. For comparison, value relevance studies have reported high adjusted R^2 of 84% (Graham et al., 2003), 96% (Kallapur and Kwan, 2004, UK data), 81% (Harris and Kemsley, 1999) and 62% (Francis and Schipper, 1999). For the full sample, the adjusted R^2 of the basic model (i.e. without realistic reporting) is approximately 82%, compared to 90% for the full model (i.e. including the realistic reporting numbers (*IFLTB* and *APLFBT*)).

The results indicate that by adding the realistic reporting numbers into the basic model the explanatory power of the model increases significantly, given that the partial-F statistic is significant at the 0.1% level. For instance, the partial F-statistic increases from 17.60 to 27.59 for the life sample.

Consistent with the non-parametric results it appears there is support for Hypothesis 1. In addition, the results also indicate that the realistic reporting provides incremental information over earnings and book value of equity under the MSSB, thus supporting Hypothesis 2. The realistic reporting disclosures appear to contribute significantly to the valuation model since the partial F-statistic is significant at the 0.1% level and also appear to be incrementally value-relevant over the MSSB earnings and book value. The market seems to place a high value on these 'realistic' disclosures.

Interpretation of the correlation coefficients and significance of the individual independent variables in the models cannot go beyond general comments because of the small number of avail-

Table 3
Summary of non-parametric tests for measures of association with market value of equity

Panel A: Spearman rank correlation coefficients (for full sample)

Year(s)	2000 (n=6) MVE	2001 (n=8) MVE	2002 (n=10) MVE	2003 (n=10) MVE	2004 (n=10) MVE	2000–2004 (n=44) MVE	2000–2004 (n=44) Per-share
MSSBK	0.94**	1.00***	0.99***	0.98***	0.98***	0.96***	0.71***
IFLTB	1.00***	0.95**	0.92***	0.93***	0.92***	0.91***	0.78***
MSSERN	0.09	–0.02	0.39	0.90***	0.94***	0.59***	0.45**
APLFBT	1.00***	–0.19	–0.13	0.71**	0.70*	0.45**	0.37**

Panel B: Spearman rank correlation coefficients (for life sample)

Year(s)	2000 (n=6) MVE	2001 (n=8) MVE	2002 (n=10) MVE	2003 (n=10) MVE	2004 (n=10) MVE	2000–2004 (n=44) MVE	2000–2004 (n=44) Per-share
MSSBK	0.94**	1.00***	1.00***	0.98***	0.98***	0.96***	0.68***
IFLTB	1.00***	0.95**	0.95***	0.98***	0.95***	0.95***	0.82***
MSSERN	0.09	–0.02	–0.17	0.83***	0.88**	0.38**	0.31
APLFBT	1.00***	–0.19	–0.62	1.00***	1.00***	0.42**	0.41**

Panel C: Kendal tau (for full sample)

Year(s)	2000 (n=6) MVE	2001 (n=8) MVE	2002 (n=10) MVE	2003 (n=10) MVE	2004 (n=10) MVE	2000–2004 (n=44) MVE	2000–2004 (n=44) Per-share
MSSBK	0.87**	1.00***	0.96***	0.91***	0.91***	0.84***	0.53***
IFLTB	1.00**	0.86**	0.78**	0.82***	0.78**	0.75***	0.58***
MSSERN	0.20	–0.07	0.24	0.73***	0.82***	0.44***	0.35***
APLFBT	1.00**	–0.21	–0.11	0.64***	0.60**	0.32**	0.27**

Panel D: Kendal tau (for life sample)

Year(s)	2000 (n=6) MVE	2001 (n=8) MVE	2002 (n=10) MVE	2003 (n=10) MVE	2004 (n=10) MVE	2000–2004 (n=44) MVE	2000–2004 (n=44) Per-share
MSSBK	0.87***	1.00***	1.00***	0.93***	0.93***	0.84***	0.51***
IFLTB	1.00**	0.86**	0.86**	0.93***	0.86**	0.81***	0.64***
MSSERN	0.20	–0.07	–0.14	0.64**	0.71**	0.27**	0.25*
APLFBT	1.00**	–0.21	–0.50	1.00***	1.00***	0.33**	0.31**

*, **, *** indicate significance at 5, 2 and 0.1% levels respectively.

MVE = market value of equity.

MSSBK = book value of shareholders' equity valued under the modified statutory solvency basis.

IFLTB = the additional present value of the in-force long-term business.

MSSERN = net income (both life and non-life business) valued under the modified statutory solvency basis.

APLFBT = the achieved profits before taxation for the life insurance business (i.e. does not include non-life business profits).

Table 4
Test of value relevance of 'realistic reporting': partial F-statistics with coefficients values and t-statistics for the regression (White's t-statistics in parentheses)

$MVE_{it+3months} = \alpha_0 + \beta_1 MSSBK_{it} + \beta_2 MSSERN_{it} + \varepsilon_{it}$ (Basic Model 1)

$MVE_{it+3months} = \alpha_0 + \beta_1 MSSBK_{it} + \beta_2 MSSERN_{it} + \beta_3 IFLTB_{it} + \beta_4 APLFBT_{it} + \varepsilon_{it}$ (Full Model 1)

Variable	Panel A: Market value				Panel B: Price-per-share			
	Full sample (n=43 ^a)		Life sample (37 excl. banks)		Full sample (n=43 ^a)		Life sample (37 excl. banks)	
	Basic	Full	Basic	Full	Basic	Full	Basic	Full
R ² Adj	81.99%	90.16%	79.81%	92.59%	64.26%	77.00%	58.99%	83.20%
F-statistic	96.67***	97.26***	72.15***	113.46***	38.75***	36.16%	26.90***	45.56***
Partial F-statistic		17.60***		27.59***		12.09***		25.48***
Intercept	9.96E+08 (1.20)	-6.27E+08 (-1.49)	-3.82E+08 (-0.99)	-2.39E+07 (-0.14)	95.91 (3.81)***	16.83 (0.69)	87.88 (3.70)***	0.13 (0.01)
MSSBK	1.71 (4.01)***	0.85 (3.77)***	2.30 (10.12)***	0.55 (2.16)*	1.36 (9.77)***	0.82 (4.75)***	1.33 (9.09)***	0.49 (2.30)*
MSSERN	3.06 (1.68)*	3.77 (2.68)***	0.94 (0.65)	1.12 (1.47)	1.84 (1.67)*	1.73 (1.81)*	1.21 (0.80)	0.07 (0.07)
IFLTB	-	2.19 (6.37)***	-	2.24 (6.83)***	-	1.72 (3.90)***	2.13 (5.85)***	
APLFBT	-	0.13 (0.16)	-	0.76 (2.09)**	-	0.41 (0.49)	1.15 (3.04)***	

^a = excluded one outlier following the calculation of *DFBETAS*.
*, **, *** indicate significance at 5, 2 and 0.1% levels respectively.
MVE = market value of equity.
MSSBK = book value of shareholders' equity valued on the modified statutory solvency basis.
MSSERN = net income valued on the modified statutory solvency basis.
IFLTB = present value of in-force long-term business.
APLFBT = achieved profits for the long-term business (before taxation).

able observations and issues of multicollinearity.³² However, the results are not inconsistent with my hypotheses and the results from the non-parametric tests. Thus, one can observe that the overall increase in explanatory power from the basic to the full model appears to be driven primarily by the in-force long-term business asset (*IFLTB*), since the coefficient is positive and appears to be significant at the 0.1% level. This is maintained for both samples (with and without bancassurers) and under both specifications (deflated and un-deflated). The level of significance does not appear to depend upon whether the *IFLTB* asset was disclosed within the main accounts or as supplementary information.³³ One can further observe that this in-force long term business asset (*IFLTB*) significantly reduces the relevance of the MSSB book value in the case of the life sample but not in the case of the full sample: this is consistent with the interpreta-

tion that once the banks are included the 'realistic reporting' adjustments represent a much lower proportion of total reported book value. Therefore, the in-force long-term business (*IFLTB*) seems to be value relevant and have incremental price relevance over and above the statutory numbers, despite the issues widely perceived in relation to the reliability of EV.³⁴ Similarly, the MSSB earnings appear to remain significant for the sample when the banks are included but have no apparent significance for the life companies only. The results again appear to be consistent with, and to that extent support, the anecdotal evidence from the insurance companies, the CFO Forum, the ABI and the majority of analysts, as discussed above.

Again, the achieved profits disclosure (*APLFBT*) appears to add explanatory power for the life sample only (i.e. excluding the bancassurers). The significance is at the 2% level for the un-deflated model and at the 0.1% level for the per-share model. That the *APLFBT* disclosure appears to be relevant and have incremental price relevance over and above the statutory numbers only for the life companies is credible, given the much higher proportion represented by their life business relative to the bancassurers and thus the much greater effect on their main GAAP accounts. It may be noted that coefficients on the book value under the MSSB method (*MSSBK*) are positive for both basic and full model specifications (both deflated and un-deflated) and for both samples (full and life only). They are significant at the 0.1% level for the un-deflated model (except only at the 5% level for life sample full model).³⁵ Although the coefficients on the MSSB earnings (*MSSERN*) are all positive they are significant only for the full sample (for both basic and full models, deflated and un-deflated) but not significant for the life sample. Further analysis suggests that the significance for the earnings variable is driven primarily by the non-life and non-insurance business of the bancassurers.³⁶

Table 5 reports the non-parametric and parametric results for the returns model equations – Basic Model 2 and Full Model 2. The results seem to further support the observations above. Both the change in achieved profits and the level of achieved profits appear to be highly positively associated with the market-adjusted returns. For the non-parametric tests, under both the Spearman rank and Kendall tau tests, the level of significance is at the 0.1% level for both samples. This high level of association does not appear to hold for the change in and level of earnings under MSSB since, although they are positively associated with returns, this is only at the 2% significance level.

The parametric tests results indicate a significant increase in explanatory power following the inclusion of the achieved profits, and the partial F-sta-

³² The correlation between *MSSBK* and *IFLTB* is at the 0.734 level – this increases to 0.893 when the bancassurers are excluded from the sample, and both correlations are significant at the 0.1% level. *IFLTB* is more highly correlated with *MSSBK* than *APLFBT* and is negatively correlated with *MSSERN* after the exclusion of the bancassurers.

³³ Model 1 was re-specified with an additional multiplicative variable (*DUMBS * IFLT*), where *DUMBS* is a dummy variable assigned the value of 1 if *IFLT* was published in the main accounts and zero otherwise. The coefficient for *DUMBS*IFLT* was 1.609 with a White t-statistic of 2.9764 which is significant at the 0.1% level and the coefficient for *IFLT* was 1.96 with a White t-statistic of 6.9873 which is significant at the 0.1% level. Thus it appears that the value relevance of the *IFLT* is not dependent on whether the information is published within the main accounts or as supplementary information. These results held true even after controlling for time and when re-run on only the pure insurance sample.

³⁴ This is a similar result to Kallapur and Kwan (2004:160) who found that brand values were positively correlated to market value despite incentives to overvalue them.

³⁵ This may reflect the fact that even the 'life insurers' have other business and other assets beyond those specifically attributable to their life insurance activities and the *MSSBK* captures all non-life net assets which do not suffer from the same accounting issues as the life part of the business. Similarly, it is true that the *MSSERN* captures non-life profits as well as those from life business: so it is interesting that *MSSERN* does lose significance when the 'realistic reporting' of life achieved profits is introduced, which may suggest that the *MSSBK* captures all the information needed for predicting what is expected to be only 'normal' profit achievable from the non-life net assets. However, this reduction in significance may simply be due to the high level of multicollinearity for this particular model.

³⁶ The models were rerun by replacing *MSSERN* with two new variables *MSSOPNL* and *MSSOPLF*. These new variables represent the MSSB operating profits for the non-life business (*MSSOPNL*) and for the life business (*MSSOPLF*), respectively. (Most companies did not disclose the segmentation of their *MSSERN* into life and non-life business therefore the segmentation of operating profit had to be used.) For the full sample *MSSOPNL* was found to be positive and significant at the 0.01% level whereas *MSSOPLF* while positive was not significantly different from zero. When the sample excluded the bancassurers the significance of *MSSOPNL* disappeared.

Table 5

Panel A: Measures of association with market-adjusted return: Pearson correlation coefficient, and non-parametric tests – Spearman rank correlation coefficient and Kendall tau correlation coefficient

	Full sample				Life sample			
	MSSERN	ΔMSSERN	APLFBT	ΔAPLFBT	MSSERN	ΔMSSERN	APLFBT	ΔAPLFBT
Pearson								
On ranked data:								
Spearman	RTN	0.40**	0.36**	0.55***	0.60***	0.46**	0.55***	0.61***
Kendall	RTN	0.35*	0.43**	0.62***	0.69***	0.45**	0.60***	0.68***
	RTN	0.25**	0.29**	0.45***	0.50***	0.33**	0.42***	0.50***

Panel B: Test of value relevance of 'realistic reporting': partial F-statistic, coefficients values and t-statistics for the returns regression (White's t-statistics in parentheses)

$RTN_{it+3months} = \alpha_0 + \beta_1 MSSERN_{it} + \beta_2 \Delta MSSERN_{it} + \epsilon_{it}$ (Basic Model 2)

$RTN_{it+3months} = \alpha_0 + \beta_1 MSSERN_{it} + \beta_2 \Delta MSSERN_{it} + \beta_3 APLFBT_{it} + \beta_4 \Delta APLFBT_{it} + \epsilon_{it}$ (Full Model 2)

Variable	Full Sample (n=41 ^a)				Life Sample (n=35 ^a – Excl. Banks)			
	Basic Model		Full Model		Basic Model		Full Model	
R ² Adj	14.43%		40.66%		16.75%		41.73%	
F-statistic	4.37**		7.85***		4.42**		7.09***	
Partial F-statistic			9.40***				9.17***	
Intercept	-0.012		-0.016		0.015		0.013	
	(-0.16)		(-0.26)		(0.17)		(0.19)	
MSSERN	0.004		0.001		0.01		0.002	
	(1.47)		(0.51)		(1.93)*		(0.86)	
ΔMSSERN	0.002		0.001		0.001		0.0002	
	(0.967)		(0.57)		(0.50)		(0.13)	
APLFBT			0.01		0.004		0.004	
			(3.83)***		(2.30)**		(2.30)**	
ΔAPLFBT			0.01		0.01		0.01	
			(2.91)***				(2.83)***	

^a = two firm-years had to be dropped from the model due to lack of disclosure of their comparative figures, also one outlier was excluded following the calculation of DFBETA in the whole sample; *, **, *** indicate significance at 5, 2 and 0.1% levels respectively (one-tailed for coefficients whose signs I predict); $RTN_{it+3months}$ = the 12-month compound daily market-adjusted return, beginning nine months prior to the accounting year end and ending the third month following the firm's accounting year end; MSSERN = net income valued on the modified statutory solvency basis; $\Delta MSSERN_{it}$ = the annual change in modified statutory income, i.e. $MSSERN_{it} - MSSERN_{it-1}$; $APLFBT_{it}$ = achieved profits for the long-term business (before taxation); $\Delta APLFBT_{it}$ = the annual change in the achieved life profits (before tax), i.e. $APLFBT_{it} - APLFBT_{it-1}$.

tistic is significant at the 0.1% level for both samples. Bearing in mind the limitations on interpreting the coefficients on individual variables given the small sample size, this increase in power appears to be driven by the 'realistic' profits (both level and change) since both are positive and significant at the 0.1% (except for the level in the life sample which has a significance level of 2%).

To investigate further this significance of the achieved profits I also examined which elements of the achieved profits appear to be highly associated with these market-adjusted returns. Currently, within the insurance industry in the UK, companies disclose certain elements of the achieved profits albeit only on a voluntary basis. The disclosure of components was not predefined by the industry until CFO Forum (2004), and hence has varied across firms. However, the majority of firms in the sample did disclose the following main segmentations of their achieved profits:

- a) Contribution from new business (*NB*)
- b) Contribution from in-force business (*IF*)
- c) Expected return on shareholders' net worth (*ERSHS*)

The companies often define the sub-total of elements a)–c) as 'operating profit', which is then used by many companies to reward their senior managers' performance (e.g. Deloitte, 2005). The contribution from new business and in-force business can either be positive or negative depending upon firm specific assumptions and the changes in them, but one would certainly expect both to be predominately positive.³⁷ The expected return on shareholders' net worth (*ERSHS*) will be always positive as it merely represents the unwinding of the discount rate, although the change in *ERSHS* could be negative. This analysis does not include all items contained in the *APLFBT* – other items could also include operating assumption changes, experience variances (including the variance between expected and actual investment returns) and exceptional items. However, I was not able to collect all these items individually due to lack of disclosure by some firms, or because the amounts were amalgamated with other items and therefore were not a clean measure. In order to capture these items I therefore constructed an overall residual variable (*RES*), which is calculated as the difference between *APLFBT* before and after allowing for the above identifiable components. The new variables investigated were therefore:

- NB_{it} = contribution from new life insurance business per-share for the year;
 IF_{it} = contribution from in-force life insurance business per-share for the year;
 $ERSHS_{it}$ = expected return on shareholder's net worth per-share for the year;

- RES_{it} = residual amount per-share from *APLFBT* after deducting *NB*, *IF* and *ERSHS*;
 ΔNB_{it} = the annual change in the contribution from new life insurance business per-share, i.e. $NB_{it} - NB_{it-1}$;
 ΔIF_{it} = the annual change in the contribution from in-force life insurance business per-share, i.e. $IF_{it} - IF_{it-1}$;
 $\Delta ERSHS_{it}$ = the annual change in the expected return on shareholder's net worth per-share, i.e. $ERSHS_{it} - ERSHS_{it-1}$;
 ΔRES_{it} = the annual change in the residual amount per-share calculated above, i.e. $RES_{it} - RES_{it-1}$.

Anecdotal evidence suggests that the two key drivers of operating profit are the annual change in the contribution from the in-force business (ΔIF) and the value of new business (*NB*) (Ernst & Young, 2004).

The descriptive statistics and non-parametric tests are reported in Table 6. The median of *RES* is –£4.61 per share for the life sample. This residual amount constitutes a significant proportion of the total life achieved profits before tax (*APLFBT*). The results indicate that both the change in new business (ΔNB) and the change in in-force business (ΔIF) are positive and associated with the market-adjusted returns at the 2% and 5% significance level respectively. This suggests that the changes in new business and in-force business, but not the change in expected shareholders return, are major drivers of the value relevance of the change in *APLFBT* in Full Model 2. This is consistent with the view of the CFO Forum (2004) who state that 'new business value as a proportion of present value of new premiums is a key performance indicator followed by management and analysts'.

In addition, Table 6 shows that *RES*, which is positive and significantly associated with market returns at the 0.1% level, appears to be the most significant element driving the value relevance of the change in *APLFBT* in the Full Model 2. As I am unable (by definition) to decompose *RES* it is not possible to identify the reason for this – although one might suspect that investment performance is often a major factor.

9. Conclusions and implications for standard-setters

Overall, the results indicate that the supplementary 'realistic' information is value relevant and has in-

³⁷ One firm within my sample did disclose a negative new business result for one year. They noted that due to changes in the structure of the business etc. this had resulted in some new business becoming unprofitable. The same firm also reported a negative in-force business result, which they explained was due to adverse changes in lapse assumptions.

Table 6
Descriptive statistics of segmental information on achieved profits and their measures of association with market-adjusted return for the life sample

Panel A: Descriptive statistics: median and range

Variable	Life sample
	<i>Median</i> <i>Range</i>
NB	5.21 37.39
IF	9.82 55.24
ERSHS	2.65 50.05
RES	-4.61 158.41
ANB	0.49 12.94
ΔIF	0.05 34.30
ΔERSHS	0.05 36.90
ΔRES	-4.18 233.86

Panel B: Measures of association: Pearson correlation coefficient, and non-parametric tests – Spearman rank correlation coefficient and Kendall tau correlation coefficient

Pearson	<i>RTN</i>	<i>NB</i>	<i>IF</i>	<i>ERSHS</i>	<i>RES</i>	<i>ΔNB</i>	<i>ΔIF</i>	<i>ΔERSHS</i>	<i>ΔRES</i>
Rank data									
Spearman	<i>RTN</i>	0.05	0.02	0.05	0.76***	0.64**	0.31*	0.18	0.74***
Kendall tau	<i>RTN</i>	0.02	0.01	0.06	0.58***	0.43**	0.23*	0.16	0.63***

*, **, *** indicate significance at 5, 2 and 0.1% levels respectively.

RTN = is the 12-month compound daily market-adjusted return, beginning nine months prior to the fiscal year end and ending the third month following the firm's fiscal year end;

NB = contribution from new life insurance business for the year;

IF = contribution from in-force life insurance business for the year;

ERSHS = expected return on shareholder's net worth for the year;

RES = residual amount from *APLFBT* after deducting *NB*, *IF* and *ERSHS*;

ΔNB = the annual change in the contribution from new life insurance business, i.e. $NB_{it} - NB_{it-1}$;

ΔIF = the annual change in the contribution from in-force life insurance business, i.e. $IF_{it} - IF_{it-1}$;

ΔERSHS = the annual change in the expected return on shareholder's net worth per-share, i.e. $ERSHS_{it} - ERSHS_{it-1}$;

ΔRES = the annual change in the residual amount calculated above, i.e. $RES_{it} - RES_{it-1}$.

cremental value relevance over the GAAP accounts. What are the implications of these results for standard-setters, especially the IASB as it progresses with Phase II of its insurance project, and for the insurance industry as a whole, home and overseas? Clearly, this 'realistic reporting' should continue: but should it now be incorporated into the main accounts? Barth et al. (2001) argue that value relevance studies can assist standard-setters by providing evidence on value *relevance* but that it is not possible to draw specific policy conclusions because of the trade-off between reliability and relevance. Holthausen and Watts (2001) and Watts (2003) also note that accounting standards are shaped by factors other than simply what is valuable for investors in terms of pricing.

'Without descriptive theories to interpret the empirical associations the value-relevance literature's associations have limited implications or inferences for standard setting; they are just associations... Those inferences are not likely to be useful if the evidence suggests standard setters do not consider stock valuation association an important attribute.' (Holthausen and Watts, 2001: p.4)

However, given the FASB/IASB objective to provide information useful to investors (e.g. IASB, 2006) 'value relevance' studies give at least a *prima facie* indication of what information investors actually use.

Other major users are creditors (e.g. IASB, 2006). In the insurance context the primary long-term creditors are policyholders, whose protection is generally the responsibility of statutorily appointed regulators. What information do the current GAAP reports provide to investors and creditors/regulators? While rejecting (at least for now) embedded values – even though they provide the information that is most valued by analysts

(Horton and Macve, 1997) – the ASB's (2004) FRS 27 *Life Insurance* comments (Appendix 4 Para. 7.4):

'Existing insurance accounting focuses more on the needs of prudential regulation than on the information needs of investors. As a result, the true and fair financial statements are not very good at providing shareholders with useful information about the value of their interests in the business.'³⁸

But in the UK (unlike in continental Europe) the MSSB accounts are not in fact the basis for solvency regulation. As ASB (2004) also explains, the unmodified statutory solvency basis (SSB) – and now 'twin peaks' – returns to the FSA are. So it is not at all clear what, if any, purpose the MSSB accounts serve other than legal compliance with the EU IAD. It has been noted that for countries where there is not a separation between the solvency regulatory accounts and the GAAP accounts, regulators are discussing the possibility of increasing the regulatory margins for accounts based on less conservative bases (whether that be EEV or fair value accounting (IAS 39)), relative to their current margins based on the IAD etc. However, the IASB Phase II discussions have made clear that IASB is not directly interested in regulatory solvency and it is not a primary objective of general purpose accounts to aid the regulators in this regard.

So, if the focus is on investors, what should the objectives of the GAAP accounts be? Three major objectives of insurers' financial reporting can be identified (e.g. Horton and Macve, 1995): signalling expectations to investors to assist shareholders (and, where relevant policyholders) in appraising the company's financial position, performance and prospects; establishing property rights (e.g. policyholder bonuses, dividends, taxation, management bonuses and other contractual purposes); and regulatory (monitoring solvency etc.). Apart from management bonuses, the property rights and regulatory objectives can be adequately dealt with by the separate regulatory returns which UK insurers have to provide to the FSA and publish annually and which distinguish them from 'ordinary' companies where the Companies Act accounts must also serve these other purposes. So for insurers, the Companies Act GAAP accounts can focus on giving a true and fair view³⁹ for the purposes of the signalling objective, which implies that, in determining what may be included in the primary financial statements, relevance can be given a greater emphasis over reliability than is conventional in accounting for other enterprises. This means that companies wishing to incorporate a basis such as the 'achieved' profits basis into their main financial statements (as several bancassurers still do and as

³⁸ At para. 7.8 it adds that it was decided not to prohibit embedded value for those entities currently using it in their main financial statements as it would mean forcing them 'back onto a basis of accounting that the Board has acknowledged is very unsatisfactory – the MSSB basis (albeit modified by the FRS)'. However, a representative of the International Association of Insurance Supervisors ('IAIS') is an observer on the IASB's insurance working group <http://www.iasb.org/About+Us/About+Working+Groups/Insurance.htm>.

³⁹ Horton and Macve (1995) note that 'true and fair' is a dynamic concept whose meaning evolves over time as ideas and practices change. They distinguish two major meanings of 'true and fair': 'true and fair (actual)' and 'true and fair (ideal)'. 'True and fair (actual)' is a 'legal term of art reflecting only what a court would regard as an acceptable basis of accounting in the light of current statutory requirements and accounting standards taken together with established practice.' By contrast, 'true and fair (ideal)' reflects 'desirable developments in accounting practice towards more realistic representation of financial performance and position.' On this basis it can be argued that the MSSB basis can be used in 'true and fair (actual)' accounts.

some standalone insurers had already started to do before the ABI/ASB ban) may indeed legitimately do so; which in turn may raise questions about the bases on which other financial institutions prepare their accounts. In other words, insurance companies' solvency may be taken to be strong enough, given the FSA requirements, that users can be confident that the insurer has passed this 'hygiene factor' and as such the accounts should focus on providing information that is relevant to investors – such as the 'realistic' reporting currently supplied in the supplementary disclosures.

Would the current accounting frameworks allow the EV to be recognised in the primary accounts? The IASB's (1989) *Framework* states that published financial statements are:

'...based on the information used by management about the financial position, performance and changes in financial position of the entity'. (para 1)

also

'An essential quality of information provided in financial statements is that it is readily understandable by users.' (para 25)

and

'...to be useful, information must be relevant to the decision making needs of the user'. (para 26).

Under these criteria, it would appear that EV would be suitable for use as a measurement basis in the balance sheet, as it is designed to communicate value creation/destruction (rather than the legal ability to pay dividends) and better to reflect economic reality, in particular the effect of management decisions. However, whether the IASB itself would accept the greater emphasis on relevance rather than reliability remains questionable.⁴⁰ If it does not do so, there is clearly an increasing danger that the main 'GAAP' accounts will be sidelined as merely formal, ritualistic and largely irrelevant, unless the opportunity is now taken to argue for a more flexible and informative approach. This would bring about the situation feared by Todd Johnson, as expressed in the quotation at the start of this paper.

However, there is some risk that mandatory standardisation within the main accounts might *reduce* the value relevance of the information relative to the present regime of essentially voluntary disclosure. The dangers of information loss through standardisation and uniform prescription are illustrated by the findings of previous studies regarding the irrelevance of the standardised oil and gas company disclosures in the US under SFAS 69's

'reserve recognition accounting' (e.g. Dharan, 1984). There may also be a risk that, once institutionalised as the primary focus of reporting, incentives to manage these earnings results may intensify and, given the long run uncertainties involved in the estimates that have to be made in life insurance, might not be wholly contained by the discipline of audit.

Holthausen and Watts (2001:29) note:

'An accounting number that is value relevant in a study before it becomes part of GAAP could well cease to be value relevant after it becomes part of GAAP if it is not verifiable...Such estimates or disclosures, even if produced by management prior to their forced recognition, could be relatively free from bias and noise because managers' incentives to bias and include measurement error are not as strong.'

These issues are beyond the scope of this paper. However, this study has offered evidence in support of the anecdotal consensus that EV disclosures are relevant to investors. Value relevance studies such as this can in this way provide useful input to evidence-based policy making for accounting standard-setting.

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⁴⁰ The latest update on Phase II of the IASB's insurance project is available at www.iasb.org.uk.

- cial reporting standards and other financial reporting issues'. *The Geneva Papers*, 30:101–107.
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The influence of comparative pay, customer service measures and accounting profits upon CEO pay in the UK privatised water industry

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Abstract—The paper investigates the influence of comparative CEO pay levels, customer service measures and accounting profits upon CEO pay in the UK privatised water industry over the period from 1992 to 2001. We argue that political and regulatory considerations can be expected to constrain CEO pay levels and to motivate remuneration committees to link CEO pay awards to simultaneous improvements in both profits and customer service improvements. The empirical results indicate that the most important drivers of CEO pay changes are sales growth and a partial adjustment to comparable UK CEO pay levels. Customer service improvements and accounting profits are also significantly related to CEO pay awards. However, consistent with regulatory incentives that mitigate the inherent financial conflicts between the two performance measures, the results suggest that the influence of customer service improvements upon CEO pay is largely indirect and stems from the impact it has upon the benchmark profit used for performance-related pay purposes.

Key words: CEO pay, profit-related pay, customer service measures, water utility regulation.

1. Introduction

This paper examines CEO pay awards in the UK privatised water industry over the period 1992 to 2001. The 10 regional water companies provide a particularly interesting research site since privatisation in 1989 transformed these utilities from state-owned and controlled bureaucracies into widely held London Stock Exchange (LSE) listed corporations subject to the same corporate governance codes and capital and labour market disciplines as all other UK listed companies. The water companies provide an opportunity, therefore, to examine the extent to which the radical changes to managerial incentives that came with privatisation have resulted in post-privatisation CEO pay levels and performance-related pay schemes that match those received by other, similar-sized, UK listed companies (Cragg and Dyck, 2000).

While there has been little detailed analysis of the post-privatisation constraints and incentives influencing executive pay, this has not prevented the privatised utilities from being widely criticised by politicians and media commentators for award-

ing supposedly 'excessive' pay packages to senior executives. Although post-privatisation the water companies' pay practices are not subject to any more regulation than other UK firms, regulatory rules and stakeholder/political pressures in relation to issues such as pricing, risk taking and customer service levels appear to have inhibited remuneration committees from raising their senior executives' pay levels in line with what comparable UK executives receive (see Ogden and Watson, 2004). In this paper we focus on political and regulatory constraints and how these may influence the relationships between CEO pay awards and accounting profits and customer service measures, a key non-financial performance indicator that reflects the interests of a stakeholder group other than shareholders (Coombs and Gilley, 2005; Hillman et al., 2001). We show that the water companies have strong (i.e., financial) regulatory and political incentives, and 'reputational' imperatives, to demonstrate measurable performance improvements in terms of customer service levels and suggest that empirically their CEO pay awards are likely to mirror these regulatory incentives.

These regulatory incentives emanate from the new regulatory framework established at the time of privatisation. As privatisation did little to change the monopoly character of the industry a new regulatory agency, the Office of Water Services (OFWAT), was set up to provide both economic regulation, primarily via price controls based upon cost efficiency benchmarks, and to

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protect customers' interests. OFWAT has therefore a duty to ensure that the water companies make acceptable trade-offs between cost efficiency, providing a reasonable return to the shareholders and the protection of customer interests. As part of the fulfilment of these duties, OFWAT requires the privatised companies to supply information regarding their performance in terms of a range of clearly defined and standardised discretionary customer service levels, such as minimising leakages, interruptions to supply, maintaining adequate water pressure and responses to customer complaints. All of these performance measures are audited and subsequently published by OFWAT in sufficient detail so as to allow any interested party to undertake meaningful between-firm performance comparisons. Moreover, as OFWAT strategy and policy documents have consistently indicated, these customer service indicators constitute a major input in respect of price cap adjustment decisions, such that the water companies would be guaranteed to earn an economic return on investments that lead to measurable improvements in customer service levels.

We argue that CEO pay awards and improvements in customer service levels ought to be positively related as the regulatory system provides the water companies with significant financial and political incentives to generate improvements in customer service levels. Nevertheless, simply adding a customer service metric to an existing financial performance-based pay scheme is unlikely to be incentive compatible due to the negative impact that improvements in customer service levels can be expected to have upon the accounting profits conventionally used to reward executives. We argue, therefore, that remuneration committees may be expected to devise a performance-related pay scheme which reflects the regulatory incentives designed to mitigate the inherent conflict, i.e., trade-off, between these two performance measures.

The research method used to empirically evaluate the above hypotheses involves an evaluation of the relative explanatory power of three parsimonious CEO pay change models, each incorporating differing behavioural assumptions regarding the relationships between changes in CEO pay and the pay of comparable CEOs, corporate profitability and the customer service performance indices. Each of the models is estimated using data from the water companies' published financial statements and their customer service performance in-

dicators audited and published by OFWAT. Our analysis also applies the estimated parameters from a UK CEO pay-level model to the water company data to derive a proxy for each CEO's comparable external labour market pay level.¹

The empirical results indicate that, though the most important drivers of CEO pay changes appear to be sales growth and a partial adjustment related to our proxy for comparable UK CEO pay levels, both customer service measures and accounting profits are significantly positively related to CEO pay awards. However, consistent with pay strategies designed to reflect both regulatory incentives and shareholder governance objectives, the empirical results suggest that the influence of customer service measures upon CEO pay awards is largely indirect and stems from the impact it has upon the benchmark profit used for performance-related pay purposes.

The paper is structured as follows. Section 2 briefly describes the UK's system of corporate governance and examines the evidence to date regarding the impact of remuneration committees on CEO pay, in particular, the apparent consequences of requiring committees to base CEO pay on external labour market pay comparisons and, for incentive alignment reasons, on firm-performance improvements. Section 3 focuses on the post-privatisation corporate and regulatory environment of the water companies. This section includes an analysis of the political and regulatory factors that provide incentives for the water companies to expend resources in improving their customer service performance, followed by a description of the OFWAT mandated customer service indicators and their expected impact upon corporate profits. Section 4 first presents our main hypotheses regarding how remuneration committees might design and operate an incentive compatible pay scheme that appropriately rewards CEOs for improvements in corporate profits and customer service levels. This is followed by the specification of the CEO pay award models and variables used in our empirical analysis and how these models allow for the evaluation of each of our hypotheses. The empirical analysis is presented and discussed in Section 5. The final section summarises the main findings and discusses some possible implications and avenues for further research into these issues.

2. CEO pay in the UK

Since the introduction of the Cadbury (1992) Report reforms in 1993, the pay of senior executives of large publicly listed companies in the UK has been the responsibility of the remuneration committee, a subcommittee of the board of directors whose members and chairman are now required to be independent non-executive directors.

¹ The parameters of the UK CEO pay-level model were estimated from CEO pay and corporate data relating to all listed UK non-financial firms with the requisite information on the Datastream database over the period 1991 to 2000. This resulted in a panel with a total of 6,853 usable firm-year observations, the results of which are presented in Appendix 2.

The primary purpose of the remuneration committee is to ensure that executives receive an appropriate level of remuneration given prevailing executive labour market conditions and, for incentive alignment reasons, have their pay awards more closely linked to corporate performance, such as shareholder returns or accounting profits. Notwithstanding these declared purposes, the practice of remuneration committees has attracted considerable criticism. Although none of the UK reports into corporate governance (Cadbury, 1992; Greenbury, 1995; Hampel, 1998), or the 'Combined Code' (1998) has suggested that the purpose of the remuneration committee was to control or otherwise hold down senior executive pay, remuneration committees have been seen to be overly generous and to have generated an upward ratchet in CEO pay. The Combined Code (1998), for example, commented as follows:

'B.1.1 The remuneration committee should provide the packages needed to attract, retain and motivate executive directors of the quality required *but should avoid paying more than is necessary for this purpose.*

B.1.2 Remuneration committees should judge where to position their company relative to other companies. They should be aware what comparable companies are paying and should take account of relative performance. But they should use such comparisons with caution, in view of the risk that they *can result in an upward ratchet of remuneration levels with no corresponding improvement in performance....*' (emphasis added).

The available empirical evidence (see Ezzamel and Watson, 1998, 2002) appears to confirm that such market pay comparisons have produced an upward ratchet in CEO pay levels due to the asymmetric reactions by remuneration committees to positive and negative differences between actual pay and the pay levels of CEOs running comparable sized businesses. Ezzamel and Watson (1998) found that average CEO pay levels rose over time, i.e., was non-mean reverting, largely because the pay awards of underpaid executives tended to show a much greater (upwards) adjustment towards comparable market pay levels than the (downward) adjustments associated with the pay awards of similarly overpaid CEOs. Equally apparent is the inflationary effect upon executive pay from the increased use of performance related pay, particularly equity-based schemes involving option and/or share awards which, in the US, have been further encouraged by favourable tax and financial reporting regulations (see Conyon and Murphy, 2000). Moreover, the observation that executives appear to have received substantial option and share option awards irrespective of corporate

performance has also raised doubts regarding the ability and/or willingness of remuneration committees to design and operate appropriate performance-related pay schemes (Yermack, 1995).

Some researchers, and virtually all media and political comment on the issue, have argued that these observations reflect managerial rent-seeking (or simply greed) and managerial control over a captured or otherwise acquiescent board of directors (Bebchuk and Fried, 2003). Other researchers adopting financial and/or labour market approaches have, however, argued that rising CEO pay levels simply reflect the increased size and complexity of firms, the limited pool of high quality potential CEOs available and the increased levels of firm-specific risk such post-holders are expected to bear (Conyon and Murphy, 2000). Even so, the apparent eagerness of remuneration committees to increase executive pay simply because the pay of other executives has risen (Ezzamel and Watson, 1998) may also indicate that remuneration committees simply lack incentives to risk possible motivational, recruitment and retention problems and/or inadvertently signalling to outsiders an adverse judgment regarding CEO quality if they noticeably underpay their CEO. From this perspective, the general upward ratchet in CEO pay is to a considerable degree an unintended (but not unpredicted, see, Main and Johnston, 1993; Forbes and Watson, 1993; O'Reilly et al., 1988) consequence of having executive pay determined by inadequately resourced non-executives that clearly have no incentive to offer competent² CEOs' pay packages that are less generous than what seemingly comparable CEOs typically receive.

Whatever the interpretation of the empirical evidence, it is fairly evident that since their widespread adoption in the UK after 1992, most remuneration committees have been unable and/or unwilling to resist the upward bias in CEO pay awards stemming from the widespread adoption of performance related pay and external market pay comparisons. As discussed in the following section, however, the remuneration committees of the privatised water companies have behaved somewhat differently due primarily to their exposure to additional regulatory and political constraints.

3. The privatised water companies

The privatisation of the water companies in 1989, like most UK privatisations, was via a public listing of the equity shares of the enterprises on the London Stock Exchange. This method ensured

² Clearly, virtually all CEOs currently in post will be deemed to be at least competent by their non-executive directors since dismissal, rather than say a reduction in pay, is the appropriate response to known CEO incompetence.

that the privatised activities were undertaken by companies subject to the same types of financial and business risks, contractual arrangements and monitoring and control by the capital markets as any other listed company. Privatisation therefore implied not merely ownership changes but also radical changes in corporate governance and the risks and responsibilities of management. Of particular interest to the current paper, is the effect that privatisation and listed status had upon executive pay which, prior to privatisation, was typical of many other public sector organisations, i.e., characterised by low incentives and bureaucratically determined total pay levels significantly lower than those received by individuals holding equivalent positions in similar-sized listed UK companies (Cragg and Dyck, 2000). The Cragg and Dyck (2000) study indicated that, with the exception of utility companies, privatisation has tended to lead to the speedy abandonment of such public sector pay practices and, as encouraged by UK corporate governance codes, the introduction of executive pay levels and financial incentives similar to what comparable publicly listed enterprises paid their executives.

As the suppliers of an essential commodity which, for obvious public health and environmental reasons, has to be produced to certain quality standards, water and other utility companies necessarily have additional regulatory, public interest and political constraints on their behaviour. Evidence from the US, for example, has indicated that utility company compensation committees have regulatory incentives to limit the extent to which CEO pay is contingent upon shareholder returns or profitability and that where suitable indices exist, compensation committees typically have to respond to external stakeholder and regulatory pressures by rewarding executives on the basis of non-financial, customer service performance measures (Yermack, 1995; Coombs and Gilley, 2005).

The UK privatised water companies are subject to regulation by a variety of agencies, of which the most important are the Drinking Water Inspectorate (the monitor for water quality), the National Rivers Authority (for environmental regulation) and pricing and other economic regulation by the Office of Water Services (OFWAT). Due to the continued monopoly status of the water companies, OFWAT is responsible for regulating both pricing and investment agreements and for monitoring the quality and standard of service provided to customers, including the publication of customer service performance indicators relating to the levels of service achieved by each company. Thus, OFWAT has a statutory duty to protect customer interests via both price controls and incentives to improve customer service levels. It is

worth emphasising, however, that OFWAT has no formal authority to interfere in corporate decision making regarding such matters as executive pay. Nevertheless, as discussed below, other regulatory and political factors appear to influence, especially to constrain, the water companies' executive pay strategies.

Privatisation of the water industry in 1989 was, at the time, far from popular with the general public (for example, opinion poll data in the *Sunday Telegraph*, 13 August 1989 and 8 October 1989, indicated that over 80% were opposed to it). It seems unlikely that the general public has become any more favourably inclined subsequently, even though privatisation has generated wealth for the water companies' new shareholders and, relative to their public sector operations, delivered substantial improvements in corporate performance in terms of efficiency, water quality and customer service levels (OFWAT, 1999). Due to years of under-investment while in the public sector, water and sewage charges had to increase significantly in the immediate post-privatisation period in order to pay for the new investment and restructuring that these (largely EU-mandated) improvements entailed. Unfortunately for the popularity of the water companies, these increased charges also coincided with apparently large increases in water company executive pay and the more general CEO pay and corporate governance scandals that surfaced in the UK in 1990–92, which led to the setting up of the Cadbury Committee. The problem for the water companies was that though, due to OFWAT's system of price regulation, increases in executive pay had no effect upon customers water bills, this subtlety was lost in the public outrage that was generated in this (immediate post-privatisation) period when the average level of water company CEO pay rose dramatically in percentage terms.

As can be seen from Table 1, even after these large percentage pay rises, the water company CEOs in 1992 were still relatively poorly paid (£149,000) compared to the CEOs running comparable-sized UK businesses (£180,000). Though the criticisms of their executive pay policies appears not to have prevented the water companies from raising their CEO's average total cash pay (salary plus bonuses) by almost £200,000 over the subsequent nine years, it can be seen from Table 1 that they have in fact been remarkably conservative relative to other London Stock Exchange listed companies. For example, the pay gap between what the average water company CEO received and what comparable CEOs received has grown from £31,000 in 1992 to almost £190,000 by 2001. Even this pay gap grossly understates the true differences in total pay since these comparisons do not include any non-cash, e.g., options and share

Table 1
Descriptive statistics by year
(Standard deviations in parenthesis)

<i>Variable Name</i>	<i>Year</i>									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total sales (£m's) _{t-1}	332.4 (179.2)	393.3 (233.7)	467.8 (279.8)	524.5 (314.9)	584.4 (326.4)	627.2 (350.2)	751.0 (407.2)	899.2 (568.2)	979.7 (625.8)	1268.8 (709.6)
Profit/equity _t (%)	12.1 (2.3)	12.7 (1.9)	12.5 (1.7)	11.8 (1.6)	12.4 (1.3)	14.2 (2.2)	16.6 (4.4)	18.8 (4.7)	14.5 (3.0)	10.1 (3.9)
Dataseam predicted CEO pay levels (£000's)	180.0 (29.1)	197.1 (31.4)	233.6 (39.6)	277.1 (48.0)	319.0 (54.6)	351.1 (57.1)	370.9 (59.4)	394.9 (62.3)	456.1 (99.2)	538.8 (118.9)
Total cash CEO remuneration _t (£000's)	149.0 (31.0)	172.9 (40.3)	186.7 (64.7)	202.1 (67.2)	215.2 (66.1)	232.1 (59.2)	264.0 (78.5)	299.0 (109.6)	320.3 (79.3)	348.4 (95.9)
log change in CEO remuneration _t (%)	14.6 (14.6)	14.5 (13.9)	5.5 (11.2)	7.9 (11.6)	7.4 (15.1)	8.0 (18.5)	11.7 (18.8)	8.1 (15.4)	5.7 (13.6)	10.7 (10.8)
DG0 _t : Complaints to OFWAT (%)	1.8 (0.8)	4.8 (3.6)	6.6 (4.5)	6.5 (4.6)	5.2 (3.0)	5.5 (2.7)	6.1 (3.2)	5.0 (3.1)	4.2 (3.4)	5.1 (3.7)
DG2 _t : % of properties with inadequate mains water pressure	0.9 (1.0)	1.0 (0.8)	1.0 (0.8)	0.8 (0.7)	0.6 (0.5)	0.8 (0.5)	0.4 (0.3)	0.3 (0.2)	0.2 (0.1)	0.1 (0.1)
DG3 _t : % of connected properties experiencing a supply interruption	0.4 (0.4)	0.2 (0.2)	0.3 (0.3)	0.4 (0.5)	0.3 (0.4)	0.7 (0.9)	1.3 (0.9)	0.7 (0.6)	0.4 (0.2)	0.5 (0.2)
DG6 _t : Response to billing queries (5-point scale where very poor=1)	2.2 (1.2)	2.9 (1.2)	2.9 (1.3)	3.8 (1.2)	4.4 (0.7)	4.8 (0.7)	2.6 (1.3)	3.6 (1.3)	4.3 (1.5)	4.6 (1.4)
DG7 _t : Response to written complaint (5-point scale)	1.9 (1.0)	1.9 (0.9)	3.2 (1.4)	3.9 (1.7)	4.8 (0.4)	4.9 (0.3)	3.0 (1.6)	4.2 (1.6)	4.8 (1.2)	4.9 (0.6)
CUSTSERV _t : OFWAT Published Composite Measure							269.0 (48.5)	285.0 (40.1)	332.2 (85.3)	315.2 (41.6)

awards, elements of pay. Unlike other UK CEOs, the water company executives have not typically received much in the way of options or shares. Although the water plcs introduced share option schemes after privatisation they were withdrawn in 1994/1995 following criticisms, notably from the Greenbury Report (1995). In their place the water plcs implemented in 1997 the type of share based long-term incentive plans (LTIPs) recommended in the Greenbury Report. However, the LTIP schemes only paid out infrequently: between 1997 and 2001 the LTIPs for the five companies that still operated as independent companies paid out on only 10 occasions out of a possible 25.³ The maximum award was only achieved in five of these 10 occasions. Nevertheless, despite their relatively conservative approach to executive pay, the water plcs have remained favourite targets for criticism, being frequently cited by politicians and media commentators as exemplars of 'executive greed' (Department of Trade, 1998; Hutton, 1995).

Interviews with members of the water company remuneration committees reported in Ogden and Watson (2004) confirm that the remuneration committees have been very concerned to avoid further public and media 'outrage' at seemingly high and/or 'undeserved' CEO pay awards even though this was severely limiting their ability to pay their executives on a comparable basis to other UK CEOs. The majority of those interviewed also indicated that, despite being both complex and very time-consuming,⁴ they believed managers were being appropriately rewarded for improvements in both corporate performance and customer service levels (Ogden and Watson, 2004). Providing the appropriate incentives for managers to simultaneously perform well in terms of both performance measures does however require remuneration committees to mitigate the inevitable conflict arising from the negative impact that customer service improvements have upon reported profits. Of particular relevance for the current study is that previous research has indicated that improvements in

customer service indices significantly reduced contemporaneous profits but that, due to regulatory financial incentives which allowed companies to recoup these costs via adjustments in the price formula, their publication was associated with significantly positive share price reactions (Ogden and Watson, 1999). The Appendix provides a detailed description and discussion of the individual OFWAT customer service measures, and their importance to the water companies in terms of regulatory incentives and political and stakeholder pressures.

4. Hypotheses, CEO pay change models and variables

In this section, the specification of the hypotheses, estimation models, empirical predictions and variables used to evaluate the relative influence of comparative pay levels, accounting profits and the customer service measures upon water company CEO pay awards are presented and discussed. In this paper, the focus is solely upon CEO pay awards, i.e., the empirical analysis restricts itself to examining changes in CEO pay. A major advantage of focusing on pay change models is the reduced information requirements vis-à-vis estimating a complete model of the determinants of CEO pay levels. The latter would require including in the estimating equation a potentially vast list of supply and demand relevant variables related to various firm-specific and individual CEO human capital characteristics. In practice, since many of these variables are either unobservable and/or unavailable, pay-level models have to be estimated with controls for unobservable time-invariant, firm-specific, 'fixed effects'. The focus on CEO pay awards therefore greatly simplifies the empirical analysis as any such fixed effects, which by definition do not vary from one time period to another, automatically 'drop out' of the first difference pay change equations.

The analysis of the influence of comparable CEO pay levels upon subsequent pay awards does, however, require the estimation of a pay-level model. This parsimonious pay-level model, which is shown in Appendix 2 and has been estimated using 6,853 UK Datastream firm/year observations, is used solely for the purpose of providing an observable external pay benchmark, i.e., a proxy for the type of comparable CEO time *t* pay information available to remuneration committees when deciding upon time *t*+1 pay awards. Hence, for our purposes it is important that the pay-level model is an incomplete model and that its estimation requires only the use of observable publicly available information.

As we have seen, the Combined Code requires remuneration committees to award CEOs' pay increases only when justified in terms of either 'rel-

³ The LTIP schemes operated on a broadly similar basis. An award of shares, initially with a maximum of 40% of salary, was made which would vest depending on performance measured over a three-year period. The award of shares was subject to an eligibility condition, typically that the growth in EPS was at least equal to 2.5% per annum above the RPI. Once the threshold had been achieved the amount of shares actually vesting depended on the company's performance, as measured by total shareholder returns (TSR), compared with performance of a number of specified comparators. As the schemes paid out infrequently we did not consider the effects of these schemes would have made a significant contribution to our analysis.

⁴ Water company remuneration committee deliberations appear to consume significant corporate resources as the chairmen claimed their committees had to meet on average eight times per year, which is some four times the average number of meetings per year the remuneration committees of other listed UK firms typically had (Conyon et al., 2000).

ative performance' and/or 'what comparable companies are paying'. Given the assumption that changes in after-tax profits as a proportion of book equity is the appropriate corporate performance benchmark and that relative firm size in terms of total sales turnover is the primary basis by which remuneration committees determine comparative labour market pay levels, we are able to test the following three hypotheses in respect of CEO pay awards:

- H1:** For incentive alignment purposes, remuneration committees are expected to link CEO pay increases to improvements in accounting profits and therefore CEO pay awards in $t+1$ will be positively related to the $t+1$ change in corporate post-tax profits as a proportion of book equity.
- H2:** Remuneration committees base their estimates of comparative CEO pay levels on relative sales turnover and therefore CEO pay awards in $t+1$ will be positively related to observable time t changes in firm i 's sales turnover.
- H3:** Remuneration committees base their estimates of comparative CEO pay levels on relative sales turnover and therefore CEO pay awards in $t+1$ will be negatively related to observable time t differences between CEO i 's actual pay and his/her estimated comparable pay level.

As they have been derived from the objectives of remuneration committees contained in the Combined Code, these three hypotheses are expected to be equally applicable to all UK listed firms and, as such they provide the basis of our benchmark pay award model, the empirical estimating equation being the following:

$$\begin{aligned} \text{Ln}W_{it+1} - \text{Ln}W_{it} = & \alpha_t + \beta_1 \Delta(\text{Profit/Equity})_{it+1} \\ & + \beta_2 \Delta \text{Ln}(\text{Sales}_{it}) \\ & - \beta_3 (\text{Ln}W_{it} - \text{Ln}W_{it}^*) + u_{it+1} \end{aligned} \quad (1)$$

where:

$\text{Ln}W_{it+1} - \text{Ln}W_{it}$ = individual CEO i 's log change in total pay between time t and time $t+1$,
 α_t = the constant term and year dummies,

$\Delta(\text{Profit/Equity})_{it+1}$ = the change in company i 's reported post-tax Profit/Equity ratio between time t and $t+1$,

$\Delta \text{Ln}(\text{Sales}_{it})$ = the log change in firm i 's sales between t and $t-1$,

$(\text{Ln}W_{it} - \text{Ln}W_{it}^*)$ = the 'pay anomaly' variable, defined as the (logged) difference between individual i 's, time t , actual total pay ($\text{Ln}W_{it}$) and their estimated comparable market pay ($\text{Ln}W_{it}^*$).

For hypotheses H1 and H2 to be empirically supported, the respective estimated coefficients on the change in profits to equity ratio, i.e., $\Delta(\text{Profit/Equity})_{it+1}$, and the log change in sales, i.e., $\Delta \text{Ln}(\text{Sales}_{it})$, both ought to be significantly positive. The sign on the pay anomaly variable ($\text{Ln}W_{it} - \text{Ln}W_{it}^*$) coefficient is expected to be significantly negative if, as asserted by H3, remuneration committees act to reduce prior period observable market pay anomalies.⁵ The proxy for the 'comparable market pay' (i.e., W_{it}^*) of other CEOs employed in similar sized UK firms was computed by applying the water companies pay and corporate data to the parameters estimated from running the following pay-level model on 6,853 firm-year data observations relating to all the UK non-financial firms with the requisite information on the Datastream database over the 10-year period from 1991 to 2000:

$$\begin{aligned} \text{Ln}W_{it} = & Y_t + \beta_{\text{Size}} \text{Ln}(\text{SALES}_{it-1}) \\ & + \beta_P (\text{Profit/Equity}_{it}) + u_{it} \end{aligned} \quad (2)$$

where:

$\text{Ln}W_{it}$ = log of the total cash pay of firm i CEO in time $t-1$,

Y_t = a vector of year dummies and the constant to control for time-varying common effects,

$\text{Ln}(\text{SALES}_{it-1})$ = log of total sales of firm i in time $t-1$,

$(\text{Profit/Equity}_{it})$ = the reported post-tax accounting profit to (book value of) equity ratio of firm i in time $t-1$, and,

u_{it} = the regression error term of firm i in time t .

The Datastream CEO pay-level model estimates, along with an equivalent set of results from applying the model on the water companies' data, are provided in Appendix 2. It will be noted that the main differences between the two pay-level model estimates are the very much larger positive coefficient on the profit variable and the (approximately 50%) smaller intercept estimated for the water companies. The two models are, however, very similar in terms of the highly significant positive coefficients estimated in respect of the sales variable. Despite these differences in terms of the estimated parameters of the two pay-level models, the correlation between the two predicted market pay levels of the water company CEOs is in excess of 0.9. Even so, due to the larger intercept of the Datastream estimates, the two models produce substantially different average predicted pay levels

⁵ In every case, the water company CEO's actual pay was lower than the pay level estimated from the Datastream model and hence all $(\text{Ln}W_{it} - \text{Ln}W_{it}^*) < 0$.

for the water company CEOs. Also, as can be seen from Table 1, when the estimated parameters of the Datastream model are applied to the water companies CEO pay, firm size and performance data, the predicted mean pay levels of water company executives are significantly higher than their actual levels (implying that the water CEOs were materially less well paid than other comparable UK CEOs).

The water companies are also expected to have incentives to improve customer service levels and therefore to reward CEOs that have been successful in this regard. The simplest hypothesis as to how CEO pay awards are related to reported improvements in customer service levels is the following, 'main effect', hypothesis whereby remuneration committees are assumed to include customer service level performance as an additional independent performance metric to their existing pay award functions:

H4: Remuneration committees will reward CEOs for improving customer service performance and therefore CEO pay awards in $t+1$ will be positively related to the time t standardised customer service measure ($CUSTSERV_{it}$).

H4 clearly assumes that remuneration committees ignore the possible conflicting incentives and financial trade-offs created by linking CEO pay to both improving reported profits and the, costly in terms of reported profits, improvements in ($CUSTSERV_{it}$) scores. The following hypothesis suggests that remuneration committees might mitigate this possible trade-off problem simply by providing stronger incentives for CEOs to simultaneously perform well in terms of both profits and customer service measures:

H5: Remuneration committees will significantly increase the financial incentives for CEOs to achieve improvements in both reported profits and ($CUSTSERV_{it}$) scores by increasing the sensitivity of time $t+1$ CEO pay awards to changes in profits when observable time t relative customer service performance is better than average, i.e., ($CUSTSERV_{it}$) > 0 .

Hypotheses H4 and H5 can be empirically evaluated by augmenting equation (1) with the time t standardised customer service measure ($CUSTSERV_{it}$) and an interaction term to measure the increased sensitivity of pay awards to the changes in the profits of firms where ($CUSTSERV_{it}$) > 0 , as follows:

$$\begin{aligned} \ln W_{it+1} - \ln W_{it} = & \alpha + \beta_1 \Delta(\text{Profit/Equity})_{it+1} \quad (3) \\ & + \beta_2 \Delta \ln(\text{Sales}_{it}) - \beta_3 (\ln W_{it} - \ln W_{it}^*) \\ & + \beta_4 (CUSTSERV_{it}) \\ & + \beta_5 (CUSTSERV \text{ Dummy})_{it} \Delta(\text{Profit/Equity})_{it+1} \\ & + u_{it+1} \end{aligned}$$

where:

$(CUSTSERV)_{it}$ = firm i 's time t standardised customer service performance measure

$(CUSTSERV \text{ Dummy})_{it} \Delta(\text{Profit/Equity})_{it+1}$ = an interaction term which is the product of a dummy variable (if $CUSTSERV > 0$, dummy = 1 and zero otherwise) and the change in the Profit/Equity ratio of company i between time t and $t+1$.

The estimated coefficient on the $CUSTSERV_{it}$ variable will have a statistically significant positive coefficient if H4 is empirically valid since this implies that CEO pay awards are directly influenced by how well their firms had performed vis-a-vis their peer organisations in terms of the *published* customer service performance.⁶ The coefficient on the interaction term, $(CUSTSERV \text{ Dummy})_{it} \Delta(\text{Profit/Equity})_{it+1}$, which measures the differential change in profit variable slope coefficient for the ($CUSTSERV_{it}$) > 0 firms, will therefore also be significantly positive if H5 is empirically valid.

Equation (3) can, of course, be used to evaluate alternative behavioural hypotheses regarding the influence of the customer service performance measures on CEO pay awards. For example, discussions with non-board level managers at one of the water companies revealed that executives received performance related bonuses which were based on financial performance measures, but that these bonuses could only be triggered if regulatory, quality and customer service targets were first met. If these customer service performance measures were not met, the performance related bonus was not paid, no matter how good the financial performance achieved. The motive behind these arrangements, as revealed in the interviews with managers, was to provide a constraint on managers' single-minded pursuit of improved financial performance, at the expense of quality and customer service levels as measured by OFWAT's customer service performance measures. If such constraints also operate with regard to individual board-level salaries then the estimated coefficient on the $\Delta(\text{Profit/Equity})_{it+1}$ variable ought also to be indistinguishable from zero. We refer to this hypothesis as H5a.

OFWAT's regulatory incentives to improve customer service levels, including reimbursement of all or most of the additional costs involved via the pricing formula, was designed to limit the scope for possible conflicts and trade-offs between increasing profits and improving customer service

⁶ OFWAT does not publish the results of each firm's customer service performance until the late November/early December after the (April) accounting year-end to which they relate.

levels. Hypothesis H6 is based on the assumption that we might expect remuneration committees to have adopted a performance-related pay scheme that mirrors these regulatory incentives as follows:

H6: Remuneration committees will attempt to mitigate the negative (positive) impact of good (poor) customer service performance upon contemporaneous profits by adding back to reported profits the estimated impact on time t profits of firm i 's standardised customer service performance, i.e., $\Delta(\text{Profit/Equity})_{it+1} + \lambda(\text{CUSTSERV}_{it})$, where λ = the estimated impact on reported profit per standardised customer service performance unit (standard deviation).

The empirical testing of H6 consists of determining whether CEO pay awards in $t+1$ can be more efficiently explained by the change in $t+1$ profit to equity ratio after adding back the estimated impact on time t profits of firm i 's standardised customer service performance. In order to empirically evaluate H6, it is therefore first necessary to estimate λ , the proxy for the impact of CUSTSERV_{it} upon time t profit to equity ratios. We derive λ by estimating a two-way fixed effects (i.e., with individual firm and year specific intercepts) regression of time t profit to equity ratios on the standardised customer service measure and, to correct for size effects, the log of book equity as follows:

$$(\text{Profit/Equity})_{it} = \alpha_{it} - \lambda(\text{CUSTSERV}_{it}) + \beta \text{Ln}(\text{Equity})_{it} + u_{it+1} \quad (4)$$

where:

$(\text{Profit/Equity})_{it}$ = firm i 's reported profit to equity ratio in time t ,

α_{it} = the individual firm and year specific intercepts,

$(\text{CUSTSERV})_{it}$ = the standardised customer service performance measure for firm i in time t ,

$\text{Ln}(\text{Equity})_{it}$ = the natural log of firm i 's book equity at time t .

The following estimates (the test statistics in parenthesis are all significant at 1% confidence levels) were produced from running equation (4) on the 87 water company observations available over the 11-year period from 1991 to 2001:

$$(\text{Profit/Equity})_{it} = \alpha_{it} - 0.005(\text{CUSTSERV}_{it}) - 0.083\text{Ln}(\text{Equity})_{it}$$

Adjusted $R^2 = 71.7\%$.

The negative coefficient on the $(\text{CUSTSERV})_{it}$ variable is statistically significant at 1% confidence levels. Though the estimated coefficient of -0.005 may appear relatively small, $(\text{CUSTSERV})_{it}$ ranges

in value from -5.6 to 4.8 . This implies that the typical impact upon a firms' profit to equity ratio of, say, moving its $(\text{CUSTSERV})_{it}$ score from being one standard deviation below (above) the mean to one standard deviation above (below), the mean would be a 1% increase (decrease) in its profit to equity ratio. Given that the average profit to equity ratio over the study period was approximately 13%, this fairly modest change in $(\text{CUSTSERV})_{it}$ scores would be expected to produce an economically significant impact on post-tax profits of nearly 8%.

The reported results below focus solely on total cash pay because cash bonuses have typically been very modest in both absolute money terms (average bonuses being only some £40,000) and in terms of the proportion of total cash pay. Though additional analyses focusing solely on either salaries or cash bonuses have been undertaken, these have not been reported since the salary only analyses were indistinguishable from the reported (salary plus bonus) results whilst the bonus only analyses proved not to have any significant explanatory power. Similarly, additional analyses which included shareholder returns metrics as explanatory variables did not increase the explanatory power of the estimates and they have not, therefore, been reported.

5. Empirical results

The empirical analysis has been based on the total cash pay (salaries plus bonuses) received by the CEOs in each of the 10 privatised water company's over the period from 1992 to 2001.⁷ The first three full years after privatisation are, therefore, not included in the analysis because (a) the customer service performance measures did not become available until after 1991, (b) the pay change models use one-period lagged customer service performance inputs and two-period lagged firm size indicators and, (c) as discussed earlier, in the two to three years immediately post privatisation, pay changes were dominated by the rapid 'ratcheting-up' of water company executive pay towards the more generous levels typically obtained by other private sector executives in similar-sized firms.⁸ However, as can be seen from Table 1, despite this initial 'ratcheting-up' of water company CEO pay, throughout the period 1992 to 2001,

⁷ The reported results have not been adjusted for changes in personnel. However, neither the inclusion of an additional indicator variable to reflect changes in personnel nor the exclusion of cases where a change had taken place had any material effect upon the results. The reported results have been based on 77 rather than 90 observations because, since 1997 a total of five companies have been taken over and no longer produce separate accounts for their water supply and sewage businesses.

⁸ For example, the average percentage change in water company CEO pay in 1992 was almost 50%.

Table 2
Descriptive statistics and pairwise correlations for the 77 observations used in the CEO pay change models

Variable	Mean (Standard deviation)	Pearson correlation coefficients			
$\Delta \text{Log}(\text{Total Sales})_{it}$	12.64% (9.90)				
$\Delta(\text{Profit/Equity})_{it+1}$	0.29% (2.23)	0.013			
$(\text{Ln}W_{it} - \text{Ln}W_{it}^*)$	-0.555 (0.203)	0.272**	0.066		
$(\text{CUSTSERV})_{it}$	-0.178 (2.160)	-0.040	0.069	0.049	
$\text{Ln}(W)_{t+1} - \text{Ln}(W)_t$	8.87% (14.21)	0.117	0.182	-0.314***	0.180
		$\Delta \text{Log}(\text{Total Sales})_{it}$	$\Delta(\text{Profit/Equity})_{it+1}$	$(\text{Ln}W_{it} - \text{Ln}W_{it}^*)$	$(\text{CUSTSERV})_{it}$

Two-tail significance levels: * ≤ 0.10 ; ** ≤ 0.05 ; *** ≤ 0.01

Note:

$\text{Ln}(W)_{t+1} - \text{Ln}(W)_t$ = the change in the natural log of firm *i*'s CEO total cash pay between time *t* and *t*+1,
 $\Delta \text{Log}(\text{Total Sales})_{it}$ = the change in the natural log of firm *i*'s sales between time *t*-1 and *t*,
 $\Delta(\text{Profit/Equity})_{it+1}$ = the change in firm *i*'s reported profit to equity ratio between time *t* and *t*+1,
 $(\text{Ln}W_{it} - \text{Ln}W_{it}^*)$ = the difference between the logged values of CEO *i*'s actual pay and estimated market comparison pay level as estimated using the Datastream parameters shown in Appendix 2,
 $(\text{CUSTSERV})_{it}$ = the standardised composite customer service performance measure relating to firm *i* in time *t*, but reported by OFWAT in time *t*+1.

water company CEO pay was significantly below that of 'comparable' (i.e., same size) firms across all industries. Table 1 also shows that this pay gap has widened over time, even though the water companies have performed reasonably well in terms of both customer service levels and conventional financial performance measures such as sales growth (much of which stems from investments in related, but non-regulated, commercial activities) and profit to equity ratios.

Table 2 contains descriptive statistics relating to the 77 observations and the pair-wise correlations between the variables used in the empirical CEO pay change models. The low correlation statistics in Table 2 do not suggest that we are likely to encounter any multicollinearity problems when estimating our pay change models.

Table 3, Sections A and B, present the main empirical findings of our analysis of the changes in water company CEO pay.⁹ The same three models are estimated in both sections, with the only difference being that in section A, the change in post-tax profits to book equity variable has been based on

the reported time *t* and *t*+1 profit figures while in section B the imputed cost of the customer service performance in time *t* has been added back to the reported change in post-tax profit to book equity figures. Model 1, it will be recalled, is our benchmark model used to evaluate hypotheses H1 to H3. This model assumes that CEO *t*+1 pay awards are a function of an adjustment to time *t* pay differences between what the CEO was actually paid and what he/she ought to have been paid given the size of the firms' sales turnover and what other UK CEOs receive, relative changes in time *t* firm sales and *t*+1 changes in the profit to equity ratio. As can be seen from section A of Table 3, this parsimonious benchmark model appears to be well specified insofar as the coefficients on each of the 3 explanatory variables are of the correct sign to be consistent with the relevant hypotheses and are statistically significant at 5% or better confidence levels. Moreover, the explanatory power of the overall model is significant at 1% levels of confidence.

Model 2 is designed to evaluate H4, the contention that the customer service measures $(\text{CUSTSERV})_{it}$ constitute a main effect with respect to changes in CEO pay. The addition of the $(\text{CUSTSERV})_{it}$ variable to the estimating equation results in an increase in the adjusted R^2 of the

⁹ Alternative models (e.g. with additional lagged performance terms) were estimated but did not provide materially different results.

Table 3
Estimation of CEO pay changes: 1992 TO 2001(n = 77)

Section A: Reported earnings changes

<i>Independent variable</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Constant	-0.058 (1.25)	-0.060 (1.28)	-0.060 (1.29)
$\Delta \text{Log}(\text{Total Sales})_{it}$	0.317 (2.90)***	0.332 (3.16)***	0.316 (2.98)***
$\Delta(\text{Profit /Equity})_{it+1}$	2.439 (2.13)**	2.255 (2.05)**	2.709 (2.43)**
$(\text{Ln}W_{it} - \text{Ln}W_{it}^*)$	-0.390 (4.66)***	-0.393 (4.86)***	-0.404 (5.02)***
$(\text{CUSTSERV})_{it}$		0.016 (2.35)**	0.012 (2.43)**
$\Delta(\text{Profit /Equity})_{it+1}(\text{CUSTSERV}_{it} \text{ Dummy})$			-0.906 (0.57)
Year Dummies significant?	Yes***	Yes***	Yes***
Adjusted R ²	19.7%	22.0%	21.3%
F-Ratio (and degrees of freedom)	2.69 _{11,65} ***	2.78 _{12,64} ***	2.58 _{13,63} ***
F-Ratio for new variables		14.8***	1.4

Note: White's (1980) heteroskedastic adjusted standard errors have been used to compute the reported t-values shown in parenthesis.

Significance levels * ≤ 0.10 ; ** ≤ 0.05 ; *** ≤ 0.01

$(\text{CUSTSERV}_{it} \text{ Dummy}) = 1$ if $\text{CUSTSERV}_{it} > 0$, and zero otherwise,

$\Delta(\text{Profit /Equity})_{it+1} = (\text{post-Tax Earnings/Equity})_{it+1} - (\text{post-Tax Earnings/Equity})_{it}$,

All other variables defined as in Table 2.

**Section B: $\Delta(\text{Profit /Equity})_{it+1} =$
 $(\text{Post-Tax Earnings} + 0.005(\text{CUSTSERV})_{it}/\text{Equity})_{it+1} - (\text{Post-Tax Earnings/Equity})_{it}$**

<i>Independent variable</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Constant	-0.061 (1.29)	-0.060 (1.28)	-0.052 (1.06)
$\Delta \text{Log}(\text{Total Sales})_{it}$	0.332 (3.17)***	0.332 (3.16)***	0.303 (2.89)***
$\Delta(\text{Profit /Equity})_{it+1}$	2.271 (2.72)***	2.255 (2.05)**	2.937 (2.60)***
$(\text{Ln}W_{it} - \text{Ln}W_{it}^*)$	-0.393 (4.87)***	-0.393 (4.86)***	-0.408 (5.17)***
$(\text{CUSTSERV})_{it}$		0.242E-3 (0.04)	0.416E-3 (0.06)
$\Delta(\text{Profit /Equity})_{it+1}(\text{CUSTSERV}_{it} \text{ Dummy})$			-1.427 (0.93)
Year Dummies significant?	Yes***	Yes***	Yes***
Adjusted R ²	23.2%	22.0%	22.1%
F-Ratio	3.0811,65***	2.7812,64***	2.6613,63***
F-Ratio for new variables		0.2	1.8

Note: White's (1980) heteroskedastic adjusted standard errors have been used to compute the reported t-values shown in parenthesis.

Significance levels * ≤ 0.10 ; ** ≤ 0.05 ; *** ≤ 0.01

$\Delta(\text{Profit /Equity})_{it+1} = (\text{Post-Tax Earnings} + \lambda(\text{CUSTSERV})_{it}/\text{Equity})_{it+1} - (\text{Post-Tax Earnings/Equity})_{it}$.

All other variables defined as in Tables 2 and 3.

model and the coefficient on the $(CUSTSERV)_{it}$ variable is, as anticipated by H4, positive and statistically significant at 5% confidence levels. These empirical estimates appear to provide some statistical support for the contention that remuneration committees award proportionately higher pay rises to CEOs of water companies that have performed well in comparison to their peer organisations in terms of customer service measures.

Model 3, which evaluates the validity of H5, includes the additional interaction term to determine whether the sensitivity of CEO pay awards with respect to the profit to equity ratio is greater for those CEOs whose firms have achieved better than average customer service performance (i.e., $(CUSTSERV)_{it} > 0$). As can be seen from the table, the addition of the interaction term results in a slight reduction in explanatory power and the coefficient on the variable itself is both insignificant and of the opposite sign to that anticipated by H5. Moreover, the coefficient on the $\Delta(\text{Profit/Equity})_{it+1}$ variable is both large and significant at 5% confidence levels which is inconsistent with hypothesis H5a, i.e., that CEOs are rewarded for financial performance only when they achieve better than average performance in terms of customer service levels. Hence, though H1 to H4 receive strong empirical confirmation from Section A results, there is an absence of empirical support for either H5 or H5a.

Section B of Table 3 evaluates H6, which more accurately mirrors the financial incentives faced by the water companies in respect of improvements in customer service levels. The three CEO pay change models have been re-estimated using the revised post-tax change in profits variable which adds back the estimated impact upon time t profits associated with the firms' $(CUSTSERV)_{it}$ score. As can be seen from Section B, the empirical estimates of Model 1 using the revised profit figures have significantly greater explanatory power than the equivalent estimates shown in Section A using the reported profit figures. The adjusted R^2 has increased from 19.7% to 23.2% and the individual significance of the revised change in profits variable has now increased to 1% confidence levels. Moreover, the revised Model 1 estimates are also superior to both of the other two models of the relationships between changes in CEO pay and profits and $(CUSTSERV)_{it}$ scores shown in both sections A and B. Hence, the revised Model 1 results provide support for hypothesis H6, namely that the relationships between changes in CEO pay, changes in profits and customer service performance appear to mirror the regulatory incentives designed to mitigate potential conflicts between increasing corporate profits and improving

customer service outcomes.

The fairly small but significant statistical relationships between CEO pay changes, profits and the customer service measures uncovered by this study do not, however, suggest that the customer service measures are a major determinant of CEO pay awards. Even so, our analysis has evaluated only a single composite measure when in reality there are a multiplicity of possible customer service performance indicators and each individual water company may of course undertake their own individual and unique trade-offs between each of these customer service performance measures and/or with other conventional financial performance indices. Since the empirical models assume that the slope coefficients on each of these indicators are identical for each firm in each time period, a high degree of heterogeneity of this nature is likely to reduce considerably the empirically measurable influence of our composite CUSTSERV variable.

In addition, it is important to note that while good performance on customer service measures may not have a major impact on CEO pay awards, bad performance may have a dramatic non-pay impact. In the case of Yorkshire Water, for example, there is considerable circumstantial evidence to suggest that senior managers, including the CEO and chairman, left the company long before they had planned to on account of some highly publicised failures in customer service regarding water supply problems in parts of West Yorkshire in 1995. Having initially decided to deal with the shortfall in supply through rationing by restricting the supply of drinking water to standpipes in the street, the company after much critical publicity resolved to maintain 'normal' supplies by implementing a huge (and expensive) tankering operation. The company was subjected to an investigation by OFWAT, and following OFWAT's criticisms the company agreed not to raise charges by more than the rate of inflation from 1 April 1998, a benefit to customers estimated over the three years ending March 2000 to be approximately £44m. In the wake of this, it was reported¹⁰ that the chairman, Sir Gordon Jones, was to step down long before his compulsory retirement date. In March 1996 it was announced that the CEO (group managing director) was also to retire at the age of 52. These departures were seen as marking a tacit admission by the company of some of its failings concerning customer service levels (see the *Financial Times* 18.5.97). Certainly the director-general commented in OFWAT's report on Yorkshire Water's performance that he was 'encouraged that *management has changed*, inadequacies have been admitted and extra activity financed' (OFWAT, 1996, para. 1.7., emphasis added).

¹⁰ See, for example, the *Independent on Sunday* 17.1.96 under the headline: 'Water bosses for the chop'.

5. Concluding remarks

This paper has empirically estimated the relationships between changes in CEO compensation in the UK privatised water companies, external labour market comparison pay levels and financial and non-financial (customer service) performance indicators. Although financial performance measures have been the traditional basis for examining the relationship between firm performance and executive pay, little attention has been given to the role of non-financial performance measures. This is not necessarily a reflection of their relevance but rather the formidable problems involved in attempting to include them in pay-performance relationships. Defining what aspects of non-financial performance to consider, why they are important and to whom, as well as identifying reliable data for calculating appropriate measures that provide accurate indications of the degree of performance achieved invariably appear to render such analyses unfeasible. In the case of the water companies, the financial incentives and powers available to the regulator, the importance OFWAT attaches to customer service improvements and the processes involved in the measuring and the regular reporting of customer service performance provide an all too rare opportunity to include non-financial performance measures in the analysis of executive pay awards. Moreover, against a backdrop of rising UK CEO pay levels, political constraints and regulatory incentives to improve customer service performance, the water company remuneration committees ought to have an appropriately strong motivation for rewarding executives for improvements in customer service.¹¹

The results relating to the influence of external pay comparison measures indicate that remuneration committees appear to factor into their pay award decisions prior period pay anomalies relative to other comparable (in terms of firm size) UK CEOs. The results concerning the influence of external pay comparisons support earlier findings (Ezzamel and Watson, 1998, 2002) and confirm, firstly, the importance of size in determining the distribution of both the water plc and UK CEO pay levels generally and, secondly, the critical role that external pay comparisons play in explaining subsequent pay awards. The very high explanatory power of the pay anomaly variable suggests that

the relevant pay benchmark used by the water company remuneration committees is related to what other UK CEOs in similar sized firms receive. Recent annual financial statements of the water companies, which now contain greater disclosures of information regarding the activities of their remuneration committees, provide further documentary evidence of the role played by external-to-the-firm pay comparisons. All the companies state that they make use of external market comparisons and, with one exception, consultants in the pay determination process. However, it is also apparent that the remuneration committees have not attempted to adjust fully CEO pay to bring it into line with the higher pay levels characteristic of other private sector UK businesses. Throughout the study period, water company CEOs appeared significantly underpaid relative to this external benchmark, despite their companies performing well in terms of conventional financial performance criteria. There is no evidence to suggest that this conservatism in terms of CEO rewards results from shareholder pressures to constrain executive pay or arises from concerns regarding corporate performance. Rather, these relatively low CEO pay levels appear to stem largely from political constraints and the high levels of frequently ill-informed media and public criticism of privatised utilities.

CEO pay increases arising from improvements in customer service levels were expected to be less politically contentious and the empirical estimates that included CUSTSERV_{it} as an explanatory variable confirmed the existence of a positive relationship to CEO pay awards that was statistically significant.¹² The large investment outlays and financial incentives associated with improving customer service levels, and the strength of the empirical link between CUSTSERV and CEO pay awards uncovered in this paper, are certainly indicative of a substantive rather than a purely symbolic commitment (Zajac and Westphal, 1995) to improving customer service levels.

In considering the effect of customer service measures on executive pay, the analysis has also addressed the problems remuneration committees might encounter in using non-financial performance measures in determining their remuneration policies. Including a customer service metric in an existing financial performance-based pay scheme is unlikely to be incentive incompatible, as improvements in customer service can be expected to have a negative impact upon the accounting profits conventionally used to reward executives. Indeed, recent research by Coombs and Gilley (2005) confirms that a proactive approach to non-financial stakeholder concerns may sometimes have a negative effect on CEO pay. We have argued that in the case of the water companies there ought not to be a

¹¹ In all but one of the 1998–99 financial reports, the information disclosed in relation to the criteria used by the remuneration committee to decide on CEO bonuses explicitly mentions the importance of OFWAT's customer service measures in their decision-making.

¹² The analysis has not attempted to incorporate the non-cash elements (e.g., options or deferred bonuses) of CEO pay since, consistent with the findings of Yermack (1995), the water companies use of share options has been limited, particularly when compared to other UK firms (Ogden and Watson, 2004).

conflict since financial resources consumed on improving customer service levels can be reimbursed via the pricing formula. We hypothesised that CEO pay awards would reflect these regulatory incentives, and that the effect of customer service improvements upon CEO pay awards would be indirect and would only be apparent via its impact upon the profit measure used for performance related purposes. The empirical estimates in Section B of Table 3 that use the restated profit measures, i.e., the reported profits after adding back the imputed cost of the customer service measures, confirm that the customer service improvements have a positive impact on CEO pay awards, but that this impact was, as hypothesised, indirect and reflected the regulatory incentives for the water companies to generate improvements in customer service performance.

Although the results demonstrate that the customer service performance indicators do influence CEO pay awards, the degree of influence exercised may seem slightly disappointing from the perspective of those who argue that the interests of stakeholders other than shareholders should be an

important component in rewarding management performance. Even so, it is entirely possible that the full significance and influence of the customer service performance indicators we have considered has not been captured by the statistical models. It should also be borne in mind that although CEOs who achieve good customer service performance may not be greatly rewarded directly for such achievements, those CEOs who preside over poor performance may suffer draconian penalties that go beyond the withholding of performance bonuses, as illustrated in the example of Yorkshire Water.

Further research will be necessary to examine how far customer service performance indicators continue to influence the process of CEO pay determination in water companies. However, in view of the continuing public interest in CEO pay awards in the water industry, and the importance of the customer service indicators in recent regulatory and governmental policy documents, the influence of these customer service indicators in determining executive pay is unlikely to diminish in the foreseeable future.

Appendix 1

The UK privatised water industry

A1. The regulatory framework

The 10 English and Welsh Regional Water Authorities – Anglian, Northumbrian, North West, Severn Trent, Southern, South West, Thames, Wessex, Yorkshire and Welsh Water – were privatised in 1989. They varied in size from Thames, the largest with a turnover in 1989 of £558m and a workforce of 8,977, to South West, the smallest with a turnover in 1989 of £106.3m and a workforce of 1,876. Although privatisation was generally justified on the grounds that private sector provision of goods and services subject to the disciplines of market forces is more efficient than public sector provision (Cmnd 9734, 1986), the opportunity to develop market competition in the water industry was extremely limited (Littlechild, 1986). As a result the degree of regional monopoly exercised by each water company remained largely unaffected by privatisation. This necessitated the introduction of a new regulatory framework centred on OFWAT.¹³ Economic regulation is operated, as with other regulated privatised utilities, through price control, with the director-general of OFWAT determining charges on the basis of the retail price index plus a 'K' factor. The K factor is based on investment requirements, operating costs and revenues, and efficiency targets and is evaluated separately for each company so that company specific circumstances may be taken into account. Management is, however, subject to cost/efficiency 'yardstick' competition as the director-general is able to make comparisons between the water companies when reviewing each company's K factor (Littlechild, 1986; Cowan, 1994).

A2. Customer service performance measures

The absence of competitive market conditions in the water industry after privatisation also required OFWAT to develop a regulatory framework that would protect customer interests relating to matters other than simply price and efficiency concerns. Since 1991 OFWAT has developed levels of service indicators intended to allow monitoring and comparative evaluations of the quality of service individual companies provide to their customers. There are seven levels of service indicators: they measure the adequacy of water resources (DG1), the pressure of water mains (DG2), interruptions to supply (DG3), water usage restrictions (DG4), properties at risk of sewer flooding (DG5), the response time to queries about billing (DG6), and response time to written complaints

¹³ The regulatory framework also applies to water supply only companies, which were already in the private sector. At privatisation there were 33 such companies, but 12 have subsequently lost their independence through mergers, leaving 21.

(DG7).¹⁴ The levels of service indicators are reported annually by the companies and provide a key element in OFWAT's assessment of companies in terms of service to customers (e.g. see OFWAT, November 1991). They are seen by OFWAT as 'important output measures', which will 'enable all involved in the industry to compare the relative level of service provision across all the companies' (OFWAT, October 1990:1).

Only four of the seven measures are considered appropriate for inter-company comparisons. OFWAT has argued that both the DG1 and DG4 indicators, which measure adequacy of water resources and water usage restrictions, can be significantly influenced by local climatic and weather patterns. The DG5 indicator, which measures properties at risk of sewer flooding, is also considered inappropriate for comparisons because of concern about the consistency of data currently available (see OFWAT, 1994). Of the four that are used for comparisons, DG6 and DG7 concerning billing contacts and customer complaints are measured in terms of response times. In order to make assessment of company performance on DG6 and DG7 more 'user friendly', each company is also awarded a grade for performance according to one of five categories, ranging from very good (score = 5) to very poor (score = 1). Performance measurement of DG2, pressure of water mains, and DG3, interruptions to supply, are also analysed on a five-point grading system, but reliable comparable data has only been available since 1991. To facilitate comparisons between companies OFWAT publishes annually a separate report (e.g. see OFWAT, November 1991) which sets out in tabular form each company's performance on each of the seven levels of service. This information is also highlighted in OFWAT's annual reports.

A second initiative has been to establish new independent statutory bodies, Customer Service Committees (CSCs), to represent the interests of customers. The CSCs are independent of the Water companies, and the chairman and members (usually 12) of each CSC are all appointed by the director-general. One of their most important concerns so far has been customer complaints. As well as advising the director-general on the adequacy of the complaints procedures of the companies, they themselves are involved in investigating and resolving customer complaints against the water companies. The number of complaints they receive are reported each year in the CSCs' annual reports, and are highlighted again in OFWAT's annual reports, and provide another measure of customer service which is labelled DG0 (see Table 1).

Since 1997, OFWAT has produced and highlighted in its annual reports a summary, overall customer service measure for each company by weighting and then aggregating the individual customer service indicators. Over the four-year period from 1997 to 2000, OFWAT made slight changes to the algorithm used to compute this overall measure. An increase (or decrease) in a company's customer service score from one year to the next cannot, therefore, necessarily be taken as an improvement (or decline) in that company's performance. However, none of the changes to the algorithm are likely to have significantly altered the relative rankings of firms in terms of overall customer service in any year and it is the firms' published relative performance that our hypotheses focus on.

The water companies are also subject to other regulatory agencies and so there are potentially other important non-financial measures of performance. The Drinking Water Inspectorate ensures that water companies comply with their statutory duty to supply wholesome water. It does so largely by checking the results of the sampling and analysis companies are required to carry out as laid down in the Water Supply (Water Quality) Regulations 1989. Compliance is consistently high, so companies are primarily concerned with maintaining existing performance standards and ensuring sub-standard performance does not occur. The Environment Agency is charged with the protection and improvement of the water environment in England and Wales. This includes pollution control, management of water resources, fisheries, conservation and recreation. Although it does not publish regular performance reports of water companies activities in the manner of OFWAT, any prosecutions it initiates for non-compliance with standards, particularly for unauthorised pollution discharges, are treated seriously by the water companies – not least because such instances are widely reported and commented upon in local and national media.

A3. Customer service performance variable used in the empirical analysis

The empirical analysis assumes that remuneration committees can be expected to base at least part of CEO pay upon some composite measure that summarises the 'overall' relative performance of the

¹⁴ Two further indicators, DG8, 'bills for metered customers', and DG9, 'ease of telephone contact' were added in 1996 and 1997 respectively. However, as there was virtually no variance between the 10 companies in terms of these measures, they are not included in the analyses.

firm in respect of its customer service performance. Indeed, in the empirical analysis, only the results of a 'composite' customer service measure are presented and a brief description of how this composite measure was constructed is provided below. From 1997, a standardised version of OFWAT's published overall customer service measure was used as this provides a straightforward annual relative performance measure for each company. For the period prior to 1997, an equally weighted measure constructed from the five individual annually standardised customer service indicators was used. To ensure that the five customer service performance indicators all had a positive relationship to customer welfare, the DG0, DG2 and DG3 variables were first re-estimated as 100% minus the reported percentages published by OFWAT (shown in Table 1) prior to being standardised, i.e.,

$$\text{Standardised (DG}_{it}) = [\text{DG}_{it} - \text{MEAN}(\text{DG}_t)]/\text{SD}(\text{DG}_t)$$

The advantage of standardising is that it creates variables expressed in terms of standard deviations rather than in terms of the original units (which differed across the individual indicators). This standardisation procedure enabled these five measures to be aggregated to produce a single, composite, indicator of relative customer service performance (CUSTSERV) where each of the individual (standardised) indicators has been given an equal weighting in its construction, i.e.,

$$\text{CUSTSERV}_{it} = \Sigma \text{Standardised (DG0 to DG7)}_{it}$$

For the four years 1997 to 2000 in which OFWAT published each company's overall score, the correlation of this standardised overall score with the above equally-weighted CUSTSERV_{it} measure was never less than 0.7. Hence, the CUSTSERV_{it} variable used in the pay change estimates consists of the standardised equally-weighted measure for the five years up to and including 1996 and the standardised overall OFWAT score for the years 1997 to 2001.¹⁵

¹⁵ The models were re-estimated using only the equally-weighted composite customer service measure. The results were indistinguishable from the reported results.

Appendix 2

Estimation of CEO pay levels 1991 to 2001

Dependent variable = $\text{Ln}(W_t)$, where W_t = CEOs' total cash compensation in time t

<i>Independent variable</i>	<i>Datastream model</i>	<i>Water company model</i>
$\text{Log}(\text{Total Sales})_{t-1}$	0.286 (81.65)***	0.324 (9.44)***
$\text{Profit}_t/\text{Equity}_t$	0.475e-3 (0.55)	1.727 (2.91)***
Year Dummies monotonically increasing and/or significant?	Yes***	No
Constant	1.640 (37.73)***	0.796 (1.95)*
Adjusted R ²	61.6%	76.1%
Equation F-Ratio	1000.0***	27.9***
Observations	6853	87

White's (1980) heteroskedastic adjusted t-values used.

Significance levels * ≤ 0.10 ; ** ≤ 0.05 ; *** ≤ 0.01

Note: Unlike the pay change models, which require three years of consecutive firm-level data, the above pay-level model requires only two years of consecutive data and therefore, we have 87 observations rather than the 77 observations available in the case of the pay change models.

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Precision in auditing standards: effects on auditor and director liability and the supply and demand for audit services

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Abstract—This paper analyses the economic implications for a company's directors and its auditors of variations in the degree of precision (or, conversely, the degree of vagueness) in generally accepted auditing standards (GAAS), as well as variations in the degree of precision in legal standards of due care faced by directors. Directors and auditors are assumed to be jointly and severally liable to investors and creditors for unintentional misstatements in audited financial statements that are not detected because of either or both parties' negligence. Directors choose expected cost minimising levels of audit quality and internal control quality, which together define the quality of a firm's financial reporting system. Auditors choose a level of effort, given the level of audit quality demanded by directors. The interaction between directors and auditors is modelled in a leader-follower framework, where the directors' demand decisions reflect their own vague legal standards as well as a conjecture of the auditor's production behaviour as a function of the degree of precision in GAAS. We show that decreasing the precision of GAAS initially induces an auditor to produce higher audit quality by exerting more effort. But beyond a certain critical value, decreasing precision leads to decreasing effort and auditors gamble on violating GAAS. When vagueness exceeds a second critical value, auditors exert no effort at all. The demand decisions of directors with respect to the overall quality of a firm's financial reporting system are more complex. We show that when legal due care standards are precise, or somewhat imprecise, directors will demand levels of financial reporting system quality that comply with due care standards. But as legal standards become more imprecise, the precision of GAAS becomes important and affects the quality of internal control and audit quality demanded. Initially, directors will gamble on violating due care standards, and if the degree of vagueness in legal standards becomes sufficiently large, directors will have no demand for financial reporting system quality. In the final section, we develop hypotheses concerning the effects of decreasing precision in GAAS and suggest ways in which these hypotheses could be tested using international, inter-industry, and inter-temporal comparisons of the Big 4 audit firms' market shares, audit fees, and litigation rates.

Key words: Auditing standards, auditor liability, precision.

1. Introduction

Standard-setting bodies around the world expend considerable resources in developing professional standards for the performance of audit services. The quality of audit services is not directly observable, particularly by investors and creditors who rely on audited financial statements in their decision making, and auditing standards are generally viewed as defining a minimum acceptable audit quality level. This production role of standards is linked with an auditor's legal liability to third party financial statements users, as auditing stan-

dards also help define an auditor's legal duty. That is, an auditor who complies with auditing standards will (may) be seen as exercising 'due diligence'. Conversely, failure to comply constitutes professional negligence which renders the auditor potentially liable for losses suffered by investors and creditors (hereafter, 'third parties') who rely on materially misstated financial statements.

Given this economic role, an important characteristic of auditing standards is their precision. The more precise are standards (or, the less vague or uncertain¹), the lower the variance of possible audit quality levels which could be deemed 'in compliance'. Empirically, it appears that the precision of auditing standards in different countries varies. For example, the US *Statements on Auditing Standards* (SAS) and the related auditing standards of the Public Company Accounting Oversight Board (PCAOB) are generally viewed as being the most detailed and precise in the world, while auditing standards in developing countries

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¹ In this paper we use 'vagueness', 'uncertainty' and 'imprecision' interchangeably as synonyms and as antonyms of 'precision'.

have traditionally been both few in number and imprecise. There are many possible reasons for these differences. Some standard setters – such as the Canadian Institute of Chartered Accountants' *Auditing Standards Board* and the *International Auditing and Assurance Standards Board* of the International Federation of Accountants – argue that standards should be quite general ('principles based'), thereby allowing auditors to use maximum judgment when applying rules to specific situations. On the other hand, the AICPA and PCAOB have developed rather precise and procedurally oriented ('rules-based') auditing standards, perhaps in response to the unusually litigious environment in the US.² Finally, the precision of auditing standards appears to vary across client-industries, with the most precise standards generally being written for audits of companies in regulated industries.

In this paper we analyse the economic implications for a company's directors and its auditors of variations in the degree of precision (or conversely 'vagueness') in generally accepted auditing standards (GAAS), as well as the degree of precision in legal standards of due care faced by directors. We show that changes in the precision of GAAS and of legal due care standards affect the quality of the financial reporting system demanded by directors, as well as the degree of effort expended by auditors. We then develop several empirical predictions from this analysis. We focus on the decisions of corporate directors who are responsible for producing financial statements that are free of material misstatements. Financial statements are the product of the firm's financial reporting system, which consists of internal accounting and control procedures (hereafter 'internal controls') and external auditing. The quality of these two system components can vary, and we assume that directors want to minimise the expected costs of financial reporting.³ One financial reporting cost arises from the legal liability of the company issuing financial statements, its directors, and its auditors to third parties, if audited financial statements are found to be materially

misstated. Liability can be avoided by the directors if they have reason to believe and do believe that financial statement assertions are not materially misstated.⁴ Beliefs can be based either on evidence obtained directly by directors (such as through internal controls) or through reliance upon experts, such as auditors. As noted earlier, auditing standards have two complementary roles. Ex ante they serve as a quality assurance mechanism to directors and third parties, while ex post they (help) define an auditor's level of due diligence.

We show that varying the precision of auditing standards changes audit quality levels, the demand for external auditing and internal controls, and the costs of financial reporting systems – sometimes in unexpected ways. When the standards of due care that apply to directors (i.e. legal standards) and external auditors (i.e. GAAS) are known with certainty, both auditors and directors will comply with them. Uncertainty about the respective due care levels of directors and external auditors changes both parties' behaviour. A relatively small degree of imprecision in GAAS causes an auditor to exert more effort, thereby increasing the quality of auditing produced. As GAAS become more imprecise, the auditor exerts less effort and risks being held liable to third parties. With extremely imprecise GAAS, the auditor does nothing, and simply bears the legal consequences. In situations where the auditor risks being held liable to investors (or is liable with certainty), the audit fee incorporates an expected loss or 'risk premium'. When uncertainty about the directors' legal due care level is small, the degree of imprecision in GAAS and the resulting behaviour of the auditor are irrelevant to directors. Directors will always demand a level of financial reporting system quality such that they comply with due care standards with certainty. For larger levels of uncertainty about the directors' due care level, the precision of GAAS becomes relevant to the director's demand decision. Our analysis shows that in this situation a lower level of external audit quality is demanded as auditing standards become more imprecise. This is because reducing the precision of GAAS motivates auditors to produce a lower level of audit quality (i.e. exert less effort). When external audit quality production is low, cost minimising directors will demand less external auditing.

This paper's contribution is threefold. First, unlike prior analytical studies that assume a *clear* set of professional auditing standards along with *vague* legal standards for auditors (e.g. Willekens et al., 1996; Schwartz, 1998), this paper focuses on vagueness in auditing standards. We assume that professional auditing standards are essentially the same as legal standards of due care for auditors, as we do not observe courts writing detail standards for the production of audit services. Nor

² Wingate (1997) assessed the legal environments in a large number of countries and assigned an auditor litigation risk index ranging from 0 to 15 to each country. The highest value of 15 was assigned to the US, while the next highest litigation risk countries, each with an index of 10, were Australia, Hong Kong Special Administrative Region, Netherlands, and the UK. By contrast, developing countries – such as Indonesia, the Philippines, and Turkey – were assigned index values of about 3.

³ Directors are the agents of shareholders, but we suppress the agency problem between these parties. Minimisation of expected financial reporting costs (which are borne by the current shareholders) is a reasonable objective when the interests of directors and shareholders are perfectly aligned.

⁴ For example, see Section 11(b) of the US *Securities Act of 1933*.

do court decisions normally overturn clear professional standards. But court decisions may expand on or clarify standards when these are vague, and thus influence professional pronouncements. The adoption by the AICPA of mandatory inventory observation and accounts receivable confirmation procedures in the 1940s, following the McKesson and Robbins fraud, is a well-known example. Second, the paper analyses the impact of vagueness in auditing standards on both audit quality production *and* demand by examining the decisions of both auditors (who perform audits) and company directors who demand some level of audit quality. In determining audit quality demanded, the degree of vagueness in legal due diligence standards for financial reporting applying to directors is also taken into consideration. Note that prior work by Pae and Yoo (2001) does not consider the impact of vague audit standards and legal standards facing directors while investigating investment levels in external auditing and internal control. Third, we also develop empirically testable hypotheses from the results of the analysis.

The remainder of the paper is organised as follows. In Section 2 we provide an overview of findings in prior related literature. In Section 3 the definitions and assumptions underlying the analysis are discussed. In the subsequent two sections, the effects of legal liability and standards of due care faced by directors and auditors are examined. The base case where standards are *ex ante* certain is examined in Section 4. In Section 5 the effects of imprecision (uncertainty) in standards are analysed. In Section 6 we discuss the empirical implications of the analysis. A summary and conclusions are in Section 7.

2. Prior literature

Most studies in the auditor liability literature – such as Dye (1993), Narayanan (1994), Schwartz (1997), and Chan and Pae (1998) – focus on the implications of auditor liability for auditor effort and assume that liability rules and auditing standards are precise or certain. Previous research which assumes vague legal standards is quite limited. Willekens et al. (1996) and Schwartz (1998) analyse the impact of uncertainty (or vagueness) in the legal standards of due care (negligence) facing auditors on audit effort, as well as the role of professional auditing standards (GAAS) in such a setting. Unlike the approach in this paper, both studies make a distinction between the court's standard of auditor due care (which is only revealed in the event of litigation) and professional auditing standards (GAAS). The former are assumed to be *ex ante* vague, and the latter are assumed to be a clear (certain) lower bound on audit quality or effort. These studies come to somewhat different conclusions regarding the impact of

vague legal negligence standards on audit quality as compared with what would be attained should these standards be clear. Schwartz (1998) concludes that a vague legal negligence standard has a negative effect on audit effort, and warns that audit effort and quality are *overestimated* if one assumes that the negligence rule is clear, when in fact it is vague. Willekens et al. (1996) show that vagueness in legal negligence standards can either have a positive or negative effect on audit quality, and that this depends on the degree of vagueness. Relatively small (large) vagueness will have a positive (negative) impact on audit quality as compared to the situation where negligence standards are clear. The difference in results is due to the fact that Schwartz (1998) implicitly assumes that the mean or expected level of the negligence standard is quite large (substantially larger than the socially optimal level), whereas Willekens et al. (1996) assume that the mean or expected level of the negligence standard is smaller than the extreme values assumed in Schwartz (1998), and is located in the neighbourhood of the socially optimal level. Conclusions regarding the impact of GAAS are similar in both studies. It is shown that *clear* GAAS accompanying a *vague* legal negligence standard have a positive impact on audit quality or effort.

Frantz (1999) models the audit market to capture the interplay among auditing standards, an auditor's liability, and an auditor's level of skill. The paper focuses on the impact of differences in the levels of skill of auditors on auditors' employment prospects and the quality of the audit. This analysis is first done in the absence of any imperfection in the assessment of negligence or uncertainty in the quality of audit prescribed by the prevailing auditing standards. In such a case, the quality of audit supplied by an auditor is shown to be weakly increasing in his level of skill. The paper then analyses the effect of either an imperfection in the assessment of negligence or uncertainty in the quality of audit prescribed by the prevailing auditing standards on the equilibrium schedule of audit quality. Consistent with Willekens et al. (1996), it is shown that the introduction of an imperfection in the assessment of negligence leads to a strict improvement in economic welfare as long as the probability that an auditor who exercised due care is wrongly found to be negligent (by a court) is sufficiently small.

While most studies in the auditor liability literature focus solely on auditor effort, Pae and Yoo (2001) investigate the economic consequences of auditors' legal liability in a setting where the quality of a firm's internal control system and external auditing effort jointly affect the informativeness of the auditor's report on the firm's financial statements. They present a model in which shareholders, auditors and outside investors strategically

interact, and show that if the auditor's expected liability loss is sufficiently large, the owner under-invests in the internal control system and the auditor over-invests in audit effort, leading to an efficiency loss. However, Pae and Yoo (2001) assume precise auditor negligence rules.

In summary, while previous research has examined certain aspects of the behaviour of auditors under vague legal standards (sometimes combined with precise GAAS and sometimes also considering the quality of internal controls), no study has jointly considered the impact of vagueness in the legal standards of due care facing directors (who demand audit services along with a level of internal control quality) combined with vagueness in the GAAS standards facing auditors (who supply audit services) – the problem to which we now turn.

3. Definitions and assumptions

We assume that directors and external auditors are both risk neutral expected utility maximisers, and that the market for external audit services is price competitive – for empirical evidence on competitive audit pricing see Simunic (1980) and many subsequent audit pricing studies. Utility is maximised by minimising the costs of the firm's financial reporting system and external auditing, respectively. We also assume that directors and external auditors are jointly and severally liable to third parties. That is, a failure to exercise due diligence can render either party liable up to the full amount of damages suffered by investors (i.e. potential shareholders) and creditors. Moreover, if such third party plaintiffs are successful in litigation against either directors or auditors (separately) when both are at fault, we assume the defendant will seek apportionment of damage payments with the other liable party. It is assumed that directors and auditors face the same maximum potential damages in the event that third parties suffer losses from reliance on materially misstated financial statements, which they seek to recover through litigation, and that the plaintiffs will not be deemed contributory negligent.⁵

We assume the court's standard of due care for directors is that the probability of *accidental material error* in published financial statements must be reduced to a reasonably low level.⁶ This concept is referred to as *overall financial statement quality*. Auditors, on the other hand, are expected to produce a level of audit quality that (at least) complies with generally accepted auditing standards.⁷ Both the directors' standard of due care and generally accepted auditing standards are assumed to be *imprecise* (vague). The problem is modelled as a leader-follower problem,⁸ where the directors are the central actor or the leader who conjectures the auditor's (who is the follower) audit produc-

tion behaviour as a function (among other things) of the *degree of precision* of auditing standards. Directors do this in order to assess the probability that the auditor will be negligent, and therefore will incur at least part of the damage payments should litigation occur. The probability that an auditor will be held negligent (and thus liable to third parties) is a function of the precision of auditing standards or GAAS.

3.1. Modelling the directors' choices

The quality of a firm's financial reporting system is a function of the ordered pair (q_1, q_2) , where q_1 is internal control quality and q_2 is external audit quality. We assume that the level of internal control quality demanded by directors equals the level actually produced. However, because the auditor's audit quality production decision is affected by the degree of precision in GAAS, audit quality demanded may not equal the quality supplied. In the event of litigation against directors the courts will reveal the legally required level of due care that applies to the directors, which is defined in terms of overall financial statement quality, Q , and denoted Q_c . The directors will be held liable – ex post – if the financial statement quality level de-

⁵ Basically we assume that litigation losses will be (somehow) apportioned between directors and auditors if both are deemed negligent; while, if only one party is negligent, that party bears all litigation losses.

⁶ To avoid consideration of strategic play between directors and auditors, we do not consider the case where financial statements are fraudulently misstated by the directors to deceive third parties. Such fraudulent misstatements would, of course, also violate due care standards. This assumption is not as restrictive as it might seem since most litigation against companies and their auditors involves judgmental issues such as adequacy of disclosures, valuation of assets, a firm's going concern status, etc. (e.g. see St. Pierre and Anderson, 1984). These can be considered as accidental errors. Moreover, our assumption of no agency problem between directors and current shareholders eliminates consideration of frauds involving misappropriation of assets, etc.

⁷ While audit quality denotes output and audit effort denotes input, we use the terms interchangeably since, for a particular client, a higher effort level implies higher audit quality. In the terminology of the audit risk model, audit quality corresponds to the complement of 'detection risk' and overall financial statement quality corresponds to the complement of 'audit risk'.

⁸ This involves the use of backward induction to solve an optimisation problem. In micro-economic theory, the Stackelberg model is an application of backward induction. In the Stackelberg model (von Stackelberg, 1934, and discussed in various micro-economic textbooks (e.g. Kreps, 1990)) a sequential approach is adopted to analyse the quantity decisions by firms operating in an oligopoly and where there is quantity leadership. The assumption is that one firm chooses its quantity first, or is the quantity leader, and another firm is a quantity follower. The quantity leader conjectures the quantity decision of the follower, given alternative levels of quantity supplied by the leader. From a game theoretic perspective, our model is a game of complete and perfect information, and the unique equilibrium obtained is subgame perfect.

manded is below Q_c . We assume that the company (i.e. current shareholders) indemnifies (e.g. through insurance) the directors against this personal liability. However, because of joint and several liability, a failure by directors to establish their due diligence affects the liability losses borne by an external auditor who is also deemed negligent.⁹ Note that imprecise due care standards imply that Q_c is unknown at the time directors make the demand decision as to the mix of q_1 and q_2 . Since Q_c is ex ante uncertain or imprecise, it is defined as a random variable about which the directors have some beliefs. Let $f(q_1, q_2; Q_c)$ be the probability that the court will judge that (q_1, q_2) is sufficient to guarantee the minimum quality norm Q_c .

The total expected cost of the financial reporting system is the sum of internal control costs, the cost of the external audit, and expected legal liability payments (see Section 3.3 and Table 1 for details). Expected liability payments depend on the amount of (exogenously determined) losses claimed by third parties (denoted L) arising from defects in audited financial statements, the probability that directors are held liable, and the court's allocation of losses between directors and the auditor. Note that the probability that directors are held liable is a function of the (ex ante) precision of the legal due care standards that they face. The directors will choose q_1 and q_2 such that the total expected cost of the financial reporting system is minimised. A cost minimising system is described by the ordered pair (q_1^*, q_2^*) . The corresponding level of overall financial statement quality demanded is Q^* .

3.2. Modelling the external auditor's choices

In order to solve their optimisation problem, the directors need to capture the external auditor's production behaviour and therefore to specify the external auditor's reaction function. Given the level of q_2 demanded by the directors, the external auditor has to decide upon the level of audit quality that he will actually produce, which is denoted by q and which depends on the degree of precision in GAAS. In the event of litigation, external auditors are only held liable if they did not perform the audit with due diligence, and as noted earlier we assume that performing an audit in accordance with GAAS, *as applied in the circumstances*, defines due diligence. Moreover, *client circumstances* are defined by the external audit quality level, q_2 , demanded by the directors. Although the

external auditor knows the level q_2 demanded, he may be ex ante uncertain about the court's evaluation of legal evidence he will provide in support of his claim that the audit was performed in accordance with GAAS. The degree of the auditor's ex ante uncertainty is determined by the level of precision of GAAS. Since the directors are treated as the central actor in this paper, they have to capture this uncertainty in the decision process of the external auditor. Let $g(q; q_2)$ be the probability distribution that the courts will judge that q complies with GAAS, as applied in the circumstances. It is assumed that directors and auditors share the same beliefs about the degree of precision in GAAS.

The auditor's total expected cost of producing an audit of quality q is equal to the sum of the costs of the effort expended on the audit plus the external auditor's expected liability payments to financial statement users (Section 3.3 and Table 1 provide details). The liability payment is the product of expected losses L to users from defects in audited financial statements and the probability that the external auditor will be held liable in the event of litigation.¹⁰ Note that the probability that the external auditor is held liable is a function of the (ex ante) precision in generally accepted auditing standards. Because the audit market is assumed competitive, a risk neutral auditor is motivated to minimise expected audit costs, which also equal the auditor's fee. The resulting optimal audit quality level produced by the external auditor is denoted by q^* .

3.3. Costs, losses and objective functions

Table 1 gives an overview of how losses suffered by third party users will be distributed over directors and external auditors (in the form of liability payments), and to users (in the form of losses that are not compensated) in different circumstances where there is compliance or lack of compliance with standards of due care facing both the directors and the auditor.

The objective function of the directors, given that they are uncertain about the overall financial reporting quality norm, Q_c , is:

$$C_1(q_1) + F(q_1, q_2) + L \cdot [1 - f(q_1, q_2; Q_c)] \cdot [s_1 + s_2 \cdot g(q^*; q_2)] \quad (1)$$

$C_1(q_1)$ denotes the cost to the company to acquire internal control quality q_1 . By assumption, $C_1(q_1)$ is convex and increasing in q_1 . $F(q_1, q_2)$ represents the audit fee paid by the company. In a competitive audit market, the audit fee will equal the auditor's expected cost of audit quality supplied. The third term expresses the expected damage payments by the directors (see Table 1 for details). Recall that the losses, L , are assumed to be exogenously determined and constant and that the directors are indemnified by the company so

⁹ If only the directors are deemed negligent by the court because external auditors prove their due diligence, then the company (current shareholders) will bear all liability losses.

¹⁰ More generally, the expected liability payment would also depend on the probability of detecting material misstatements, which increases with audit quality produced. However, ignoring this complication has no impact on the propositions developed from our analyses.

Table 1
Loss distribution in case of joint liability with apportionment and negligence rules for the external auditor and the directors

<i>Court sentence</i>	<i>Directors negligent?</i>	<i>Auditor negligent?</i>	<i>probability of occurrence</i>	<i>Allocation of losses</i>
Auditor is liable for fraction s_2 of the total losses; directors are liable for fraction s_1 of the total losses.	YES	YES	$[1 - f(q_1, q_2; Q_c)] \cdot [1 - g(q; q_2)]$	Directors: $s_1 \cdot L$ Auditor: $s_2 \cdot L$ Third parties: 0
Auditor is liable for all losses	NO	YES	$f(q_1, q_2; Q_c) \cdot [1 - g(q; q_2)]$	Directors: 0 Auditor: L Third parties: 0
Directors are liable for all losses	YES	NO	$[1 - f(q_1, q_2; Q_c)] \cdot g(q; q_2)$	Directors: L Auditor: 0 Third parties: 0
Auditor and directors are both not liable	NO	NO	$f(q_1, q_2; Q_c) \cdot g(q; q_2)$	Directors: 0 Auditor: 0 Third parties: L
<i>Expected damage payments directors:</i>				
$s_1 \cdot L \cdot [1 - f(q_1, q_2; Q_c)] \cdot [1 - g(q; q_2)] + 0 \cdot f(q_1, q_2; Q_c) \cdot [1 - g(q; q_2)] + L \cdot [1 - f(q_1, q_2; Q_c)] \cdot g(q; q_2) + 0 \cdot f(q_1, q_2; Q_c) \cdot g(q; q_2)$ $= L \cdot [1 - f(q_1, q_2; Q_c)] \cdot [s_1 + s_2 \cdot g(q; q_2)]$				
<i>Expected damage payments auditor:</i>				
$s_2 \cdot L \cdot [1 - f(q_1, q_2; Q_c)] \cdot [1 - g(q; q_2)] + L \cdot f(q_1, q_2; Q_c) \cdot [1 - g(q; q_2)] + 0 \cdot [1 - f(q_1, q_2; Q_c)] \cdot g(q; q_2) + 0 \cdot f(q_1, q_2; Q_c) \cdot g(q; q_2)$ $= L \cdot [1 - g(q; q_2)] \cdot [s_2 + s_1 \cdot f(q_1, q_2; Q_c)]$				
<i>Expected losses to be borne by users:</i>				
$0 \cdot [1 - f(q_1, q_2; Q_c)] \cdot [1 - g(q; q_2)] + 0 \cdot f(q_1, q_2; Q_c) \cdot [1 - g(q; q_2)] + L \cdot f(q_1, q_2; Q_c) \cdot g(q; q_2) + L \cdot f(q_1, q_2; Q_c) \cdot g(q; q_2)$ $= L \cdot f(q_1, q_2; Q_c) \cdot g(q; q_2)$				

that the current shareholders bear all the expected costs, and the directors act on behalf of current shareholders. Further, s_1 is the liability payment sharing ratio when both directors and external auditors are judged to have been negligent and liable. It represents the fraction of the expected damage payments L to be paid by the directors; thus $s_2 = 1 - s_1$ represents the fraction to be paid by the external auditor. The variable q^* denotes the audit quality actually produced by the external auditor. The value q^* is obtained from minimising the external auditor's cost function which is

$$C_2(q) + L[1 - g(q; q_2)] \cdot [s_2 + s_1 \cdot f(q_1, q_2; Q_c)] \quad (2)$$

$C_2(q)$ denotes the resource cost to the external auditor to produce an audit quality level q . By assumption, $C_2(q)$ is convex and increasing in q . The second term expresses the expected liability payments by the external auditor (see Table 1 for details). Note that these payments are a function of the precision of GAAS as well as the precision of the directors' legal due care standards.

By assessing q^* , directors conjecture the magnitude of g (the probability that the external auditor complies with GAAS given the degree of precision therein) or the extent to which the external auditor functions as a liability-sharing party. Note that the external auditor can only avoid liability by increasing his own level of production, given uncertainty in GAAS, since q_1 and q_2 and hence f , are given at the time the audit is performed.

4. Compliance when quality norms are certain

The directors' choice of the optimal mix (q_1^*, q_2^*) and the external auditor's optimal production behaviour q^* are first analysed in the simple case where the quality norms are – ex ante – known with certainty. With respect to external auditing, this setting assumes that GAAS at any and all levels of q are perfectly precise in specifying the details of audit production. In this case, the beliefs are as follows:

$$f(q_1, q_2; Q_c) = \begin{cases} 1 & \text{if and only if } \theta \cdot q_1 + q_2 \geq Q_c \\ 0 & \text{if and only if } \theta \cdot q_1 + q_2 < Q_c, \end{cases} \quad (3)$$

where θ is the weight attached by the courts to internal control as compared to external auditing in

obtaining an overall quality level of financial statements,¹¹ and

$$g(q, q_2) = \begin{cases} 1 & \text{if and only if } q \geq q_2 \\ 0 & \text{if and only if } q < q_2, \end{cases} \quad (4)$$

In the remainder of the paper, g and $g(q; q_2)$ are used interchangeably, and so are f and $f(q_1, q_2; Q_c)$.

As described earlier, the directors first analyse the auditor's reaction function, $q^*(q_1, q_2)$, and assess $g(q; q_2)$, in order to solve their optimisation problem. Given a pair (q_1, q_2) , the directors calculate the level q^* of external audit quality that minimises expression (2). Since the objective function is discontinuous at q_2 , the problem can be written as:

$$\text{Min}_q \begin{cases} C_2(q) + L \cdot [s_2 + s_1 \cdot f] & \text{if } q < q_2 \\ C_2(q) & \text{if } q \geq q_2 \end{cases} \quad (5)$$

Graph 1 illustrates the analysis when expected losses are large enough, such that: $L \cdot [s_2 + s_1 \cdot f] > C_2(q_2) - C_2(q)$. The auditor will certainly not choose to produce $q > q_2$, because then $C_2(q) > C_2(q_2)$ holds, as $\frac{dC_2}{dq} > 0$ by assumption. This would only imply a higher cost. The auditor will also not choose $q < q_2$, because he would then be held liable and bear direct audit costs plus losses (that is, $C_2(q) + L \cdot [s_2 + s_1 \cdot f]$). If for all $q < q_2$, it holds that $C_2(q) + L \cdot [s_2 + s_1 \cdot f] > C_2(q_2)$, the auditor will choose q_2 . Thus, q^* coincides with q_2 and $g = 1$.

Once the external auditor's reaction function is known, the directors optimise their own objective function. Since the auditor always complies with GAAS (i.e. $q^* = q_2$) and will never be found liable, the competitive audit fee does not contain a 'litigation risk premium' and equals $C_2(q^*) = C_2(q_2)$. The directors' objective function now reduces to:

$$C_1(q_1) + C_2(q_2) + L[1 - f(q_1, q_2; Q_c)]$$

The conclusion is similar to the auditor's case. The directors will choose (q_1^*, q_2^*) such that $Q^* = \theta q_1^* + q_2^*$ equals Q_c (assuming that losses are large enough) and $f = 1$. As a result the constraint $f(q_1, q_2; Q_c) = 1$ or $\theta q_1 + q_2 = Q_c$ can be imposed on the director's optimisation problem. The solution (q_1^*, q_2^*) satisfies the following first order condition

$$\frac{MC_1}{MC_2} = \theta,$$

That is, the ratio of marginal costs equals the weight θ . The more weight the court gives to internal control in meeting the quality norm, Q_c , (that

¹¹ That is, the courts must somehow combine internal control quality with external audit quality to determine the probability of undetected material error in the financial statements. Note that this is analogous to the auditor's real-world problem of setting detection risk as a function of inherent and control risks.

is, the larger is θ), the larger q_1^* will be relative to external audit demand, q_2^* , and vice versa. Note that corner solutions may occur. For example, in the case of linear cost functions (i.e. $C_1(q_1) = c_1 \cdot q_1$ and $C_2(q_2) = c_2 \cdot q_2$, where c_1 and c_2 represent cost parameters for internal control and external auditing respectively), it follows that $\frac{c_1}{c_2} > \theta$ implies $(q_1^*, q_2^*) = (0, Q)$ and that $\frac{c_1}{c_2} < \theta$ implies $(q_1^*, q_2^*) = (\frac{Q}{\theta}, 0)$.

To conclude, if the quality norms are known with certainty, both the directors and external auditor will comply with the norms, but only if losses are sufficiently large (i.e. $L \cdot [s_2 + s_1 \cdot f] > C_2(q_2) - C_2(q)$). The choice of the level of external audit quality demanded will depend on marginal cost considerations and on the relative importance, as assessed by the courts, of internal control compared to external auditing in achieving an overall financial statement quality level. The following proposition summarises the results:

Proposition 1.

When the levels of due care applying to external auditors (i.e. GAAS) and directors (i.e. legal standards) are known with certainty, the external auditor will produce exactly the external audit quality level demanded, and directors will demand a level of overall financial statement quality equal to the overall due care level, given that liability losses are sufficiently large.

5. Compliance when the quality norms are uncertain

In this section, we analyse the directors' and auditor's decisions when the quality norms applying to both parties are uncertain. That is, the directors do not know what level of overall financial statement quality is sufficient to establish their due diligence, while external auditors do not know what level of audit quality produced will be deemed to comply with GAAS in the circumstances. It is assumed the directors believe that the minimum norm is a random variable drawn from a bounded set, denoted by $[Q_c - \varepsilon, Q_c + \varepsilon]$, with uniform¹² probability. The subjective belief function f is therefore given by:

$$f(q_1, q_2; Q_c) = \begin{cases} 1 & \text{if and only if} \\ & \theta \cdot q_1 + q_2 \geq Q_c + \varepsilon \\ 0 & \text{if and only if} \\ & \theta \cdot q_1 + q_2 \leq Q_c - \varepsilon, \\ \frac{\theta \cdot q_1 + q_2 - Q_c + \varepsilon}{2\varepsilon} & \text{otherwise} \end{cases} \quad (6)$$

This specification of f implies that the directors are only uncertain about their liability for choices of (q_1, q_2) which yield an overall quality level, $\theta \cdot q_1 + q_2$, that is strictly larger than $Q_c - \varepsilon$ but strictly smaller than $Q_c + \varepsilon$. If overall financial

statement quality is very high, i.e. larger than $Q_c + \varepsilon$, the directors know with certainty that they will not be held liable; conversely, for very low quality levels, i.e. smaller than $Q_c - \varepsilon$, the directors are certain that they will be held liable.

The uncertainty for the auditor is modelled analogously. The belief function g is given by:

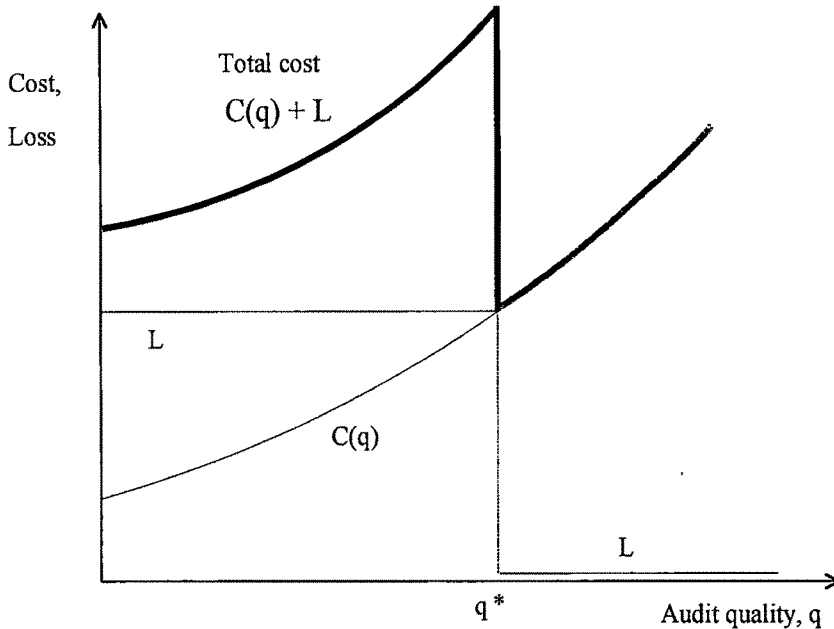
$$g(q, q_2) = \begin{cases} 1 & \text{if and only if} \\ & q \geq q_2 + \delta \\ 0 & \text{if and only if} \\ & q \leq q_2 - \delta, \\ \frac{q - q_2 + \delta}{2\delta} & \text{otherwise} \end{cases} \quad (7)$$

Given the quality q_2 demanded by the directors, the external auditor believes that the court's interpretation of audit quality which complies with GAAS is drawn from the bounded set $[q_2 - \delta, q_2 + \delta]$. Again, external auditors are assumed to be uncertain about their liability only when the audit quality they produce, q , is strictly larger than $q_2 - \delta$ but strictly smaller than $q_2 + \delta$. For external audit quality levels with a value outside this interval, auditors are certain about their compliance (non-compliance) with GAAS.

Note that we assume that the degree of vagueness about the audit quality standards is client specific. This is consistent with the situation where GAAS are generally formulated but not specified per individual client situation and context, and therefore interpretation differences may occur ex post. This assumption implies that in a competitive audit market auditors price individual audit engagements based on *expected* auditor quality choices. Given the uniform (or any symmetric) distribution of the auditor's quality choice (sup-

¹² For characteristics of uniform distributions see, for example, Spanos (1986). Note that the use of uniform distributions to capture uncertainty in this paper is purely to facilitate the exposition, and that the results presented subsequently in this paper are robust to other specifications of uncertainty about the due care level. In particular, any family of distributions of deviations around the demanded level of quality, $h(e; \lambda)$ – where e is the deviation and λ is a positive parameter – would lead to the same propositions (*ceteris paribus*) if they exhibit two properties: 1) there is some positive probability that – ex post – the court sets the due care standard *below* the demanded level of quality; 2) the probability that the absolute size of the deviation (e) from the expected (i.e. demanded) quality standard exceeds any given positive magnitude approaches zero as λ approaches zero; that is, the distribution becomes concentrated as λ approaches zero. See also Shavell, (1987, p. 94) who discusses these conditions in the context of accident law. The intuition is rather simple: given that there is a positive probability that the court sets ex post a lower audit (resp. financial statement) quality standard than the demanded quality level, the larger the uncertainty λ , the flatter the expected loss function will be. This will obviously affect the location of optimum. Note that in our paper λ is defined as δ in the external audit quality context, and as ε in the financial statement quality context.

Graph 1
The auditor's reaction function when GAAS are precise



plied), q , around the level of quality demanded, i.e. q_2 , it follows that the expected level of audit quality supplied, i.e. $E(q^*)$, equals the level of audit quality demanded, q_2 , for pricing purposes. In a price competitive audit market, this also implies that auditors do not earn rents over their entire portfolios in these circumstances, although some clients will pay more than an audit fee based on the actual (instead of expected) level audit quality supplied, i.e. q^* ; while others will pay less than an audit fee based on q^* . This situation parallels a price competitive *insurance* market, where pricing is done over an entire portfolio of clients and uncertainty about the outcome (an accident, a fire, etc...) is client specific.

From the assumptions above and the analysis of the certainty case in section 3, it follows that it does not pay for directors and external auditors to provide quality levels that are strictly larger than

$Q_c + \varepsilon$ and $q_2 + \delta$, since they are certain not to be held liable and would only incur excess costs. Hence, the constraints $\theta \cdot q_1 + q_2 \leq Q_c + \varepsilon$ and $q \leq q_2 + \delta$ can be imposed on their respective optimisation problems. To simplify calculations, quadratic cost functions¹³ are assumed, i.e. $C_1(q_1) = \frac{c_1 \cdot q_1^2}{4}$ and $C_2(q) = \frac{c_2 \cdot q^2}{4}$. Furthermore, changes in L , s_1 and s_2 caused by changes in q , q_1 , and q_2 are ignored.

5.1. The auditor's reaction function under uncertainty

The directors first conjecture what the auditor's production decision, q^* , would be for alternative levels of internal and external audit quality demanded. The auditor's reaction function is given by

$$q^* = q^*(q_1, q_2) = \min \{q_2 + \delta, q_e = \frac{L}{c_2 \delta} \cdot [s_2 + s_1 \cdot f]\} \quad (8)$$

if q_e is strictly larger than $q_2 - \delta$. Note that q_e represents the solution to the optimisation problem without the constraint $q \leq q_2 + \delta$. If $q_e \leq q_2 - \delta$ holds, the auditor's expected cost minimising decision is to produce a quality level equal to zero, since he would be held liable in any case, and would therefore choose not to incur direct audit costs, $C_2(q)$.¹⁴

In the remainder of this subsection, we analyse the impact of uncertainty about the external audit

¹³ Note that the results presented in the remainder of this paper are robust to other specifications of (positively sloped) convex cost functions.

¹⁴ This extreme result is due to the fact that L is treated as a constant in the analysis. In reality, however, L is a decreasing function of q , and therefore there would be some marginal benefit from producing a level of quality larger than zero. Ignoring the marginal benefit from reduced loss does not, however, affect the conclusions regarding the (isolated) directional (that is positive or negative) impact of vagueness in GAAS on audit quality produced.

quality norm – that is, imprecise GAAS – on the production of external audit quality and compliance with GAAS.

Graph 2 illustrates the auditor's reaction function q^* as a function of the degree of imprecision in GAAS, denoted, δ . The smaller the uncertainty about GAAS – the smaller is δ – the larger is q_e and the smaller $q_2 + \delta$. For sufficiently small values of δ , i.e. for δ smaller than a critical value δ_u , q_e is larger than $q_2 + \delta$, and $q_2 + \delta$ will be chosen. This coincides with the situation where the external auditor complies with GAAS with certainty. However, if the imprecision in GAAS is large enough and δ is strictly larger than δ_u , q_e is smaller than $q_2 + \delta$. The auditor will then produce q_e , and he may no longer comply with GAAS. If imprecision becomes very large, that is if δ is larger than a second critical value denoted by, δ_l , the auditor's optimal choice is to not comply with GAAS and be held liable with certainty. In that situation $q^* = 0$.

Graph 2 illustrates that the auditor's reaction function is discontinuous at two levels of imprecision, namely δ_u and δ_l , and that the auditor will accept a gamble on liability if imprecision in GAAS takes a value within the open interval $[\delta_u, \delta_l]$.¹⁵ Uncertainty or lack of precision in GAAS has the effect of increasing the level of quality produced, but only up to a certain level of imprecision, δ_u . Beyond that level, imprecision has a negative effect on the production of audit quality. Graph 2 also illustrates that for small (large) enough values of δ , that is if δ is strictly smaller than a critical value δ_e , the auditor – in his self-interest – will

produce a higher (lower) audit quality than the level demanded.¹⁶

Proposition 2.

Given that GAAS are imprecise, a sufficiently small imprecision (i.e. $\delta \leq \delta_u$) will result in clear compliance with GAAS, whereas a sufficiently large imprecision (i.e. $\delta \geq \delta_l$) will result in clear non-compliance with GAAS. In addition, the external auditor will produce a higher (lower) quality level than what is demanded when imprecision about GAAS is small, i.e. $\delta < \delta_e$ (large, i.e. $\delta > \delta_e$).

Proposition 2 is in line with the results obtained by Kolstad et al. (1990), who analyse the generic case of compliance with uncertain legal standards of precaution when there is only one injurer (i.e. here the auditor), and where subjective beliefs about liability are assumed to be normally distributed. In Section 5.2 the analysis is expanded to the case of two potential injurers (i.e. both the directors and the auditor).

5.2. The directors' demand decision under uncertainty

Given that external audits are competitively priced, and that GAAS (as applied in the circumstances) are ex ante imprecise, the audit fee paid by the company equals the auditor's expected cost of audit quality supplied, which consists of a direct cost component and a litigation risk premium.

$$F(q_1, q_2) = C_2(q^*) + L \cdot [1 - g(q^*; q_2)] \cdot (s_2 + s_1 \cdot f) \quad (9)$$

As noted earlier, we assume that pricing is done competitively over an auditor's entire client portfolio, and as GAAS as (ex post) applied to the client-specific circumstances is ex ante imprecise, the *expected* audit quality supplied is priced in individual engagements. Note that $E(q^*) = q_2$. Hence, the auditor's litigation risk premium is assumed to reflect the average performance over a portfolio of clients. Given this assumption,¹⁷ the auditor's compliance function, g , takes the value $\frac{1}{2}$. The audit fee in expression (9) can thus be rewritten as:

$$F(q_1, q_2) = C_2(q_2) + \frac{1}{2} \cdot (s_2 + s_1 \cdot f) \quad (10)$$

Under vague or imprecise GAAS the directors' objective function becomes:

$$C_1(q_1) + C_2(q_2) + \frac{1}{2} \cdot (s_2 + s_1 \cdot f) + L \cdot [1 - f] \cdot [s_1 + s_2 \cdot g] \quad (11)$$

Note that the directors assess auditor compliance, g , in order to determine the maximum possible value of their fraction of future liability payments (i.e. the last term in expression (11)).

5.2.1. The impact of auditor compliance on the directors' decision

The directors' decision is now analysed given the assessed probability of auditor compliance,

¹⁵ The critical value δ_u from where the auditor starts producing q_e instead of $q_2 + \delta$ – that is where the auditor accepts a gamble and may no longer comply with GAAS – has the following functional form:

$$\delta_u = \frac{1}{2} \cdot [-q_2 + (q_2^2 + \frac{4L}{c} \cdot (s_2 + s_1 \cdot f))^{1/2}]$$

The critical value δ_l from where the auditor starts producing $q^* = 0$ and from beyond where he is certainly not complying with GAAS, has the following functional form:

$$\delta_l = \frac{1}{2} \cdot [q_2 - (q_2^2 - \frac{4L}{c} \cdot (s_2 + s_1 \cdot f))^{1/2}]$$

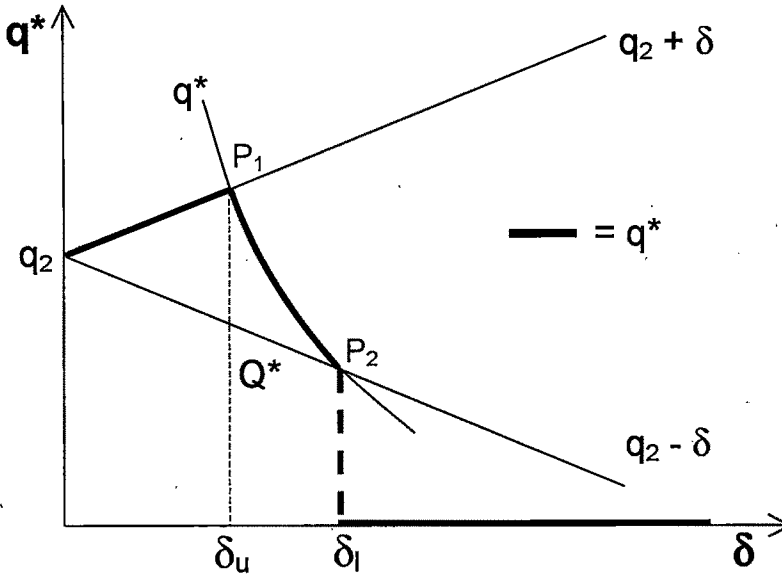
Note that δ_l is only defined if $q_2 > \frac{4L}{c} \cdot (s_2 + s_1 \cdot f)$.

¹⁶ A critical value δ_e can be defined at which the auditor produces exactly what is demanded:

$$\delta_e = \frac{L}{c_2 q_2} \cdot [s_2 + s_1 \cdot f]$$

Note that a second feasible solution is: $\delta_e = 0$. In the certainty case, the auditor also exactly produces what is demanded.

¹⁷ Note that if the directors' optimal choices are modeled such that they are affected by their client-specific conjecture of q^* , $F(q_1, q_2)$ equals expression (8). This adds a tremendous amount of unnecessary complexity to the analysis, which then becomes problematic. Given that our focus in this paper is to analyse the impact of *vagueness* in standards on external audit and financial statement quality levels, we prefer the assumption of competitive pricing based on *expected* audit quality supplied, $E(q^*)$, instead of q^* , and not to get into a complex analysis of the strategic interplay between directors and auditors.

Graph 2The auditor's reaction q^* as a function of vagueness, δ 

$g(q^*; q_1, q_2)$, with vague GAAS. From the analysis in Section 5.1 it follows that three different situations, $j \in \{1, 2, 3\}$, exist. First ($j = 1$), when uncertainty about GAAS is very small and the external auditor's reaction function is assessed to be $q^*(q_1, q_2) = q_2 + \delta$; the auditor's compliance function, $g(q^*; q_1, q_2)$, takes the value 1. Second ($j = 2$), when uncertainty about GAAS is very large and $q^*(q_1, q_2) = 0$; the auditor's compliance function, $g(q^*; q_1, q_2)$, takes the value 0. Third ($j = 3$), the situation where vagueness is such that the auditor accepts a gamble on liability and $q^*(q_1, q_2) = q_e$; in this case the auditor's compliance function, $g(q^*; q_1, q_2)$, takes a value between 0 and 1.

In the first case ($j = 1$) where the auditor produces $q_2 + \delta$ and $g = 1$, that is when q^* is at point P_1 in graph 2, the optimal level of overall quality demanded by the directors, defined as Q_1^* , is equal to:

$$Q_1^* = \theta \cdot q_1^* + q_2^* = \min \{Q_c + \varepsilon, Q_{e,1}\} \quad (12)$$

$$= \frac{L}{\varepsilon} \cdot \left(\frac{s_1}{2} + s_2 \right) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1})$$

if $Q_{e,1} > Q_c - \varepsilon$. Note that $Q_{e,1}$ represents the solution to the directors' optimisation problem for the first situation and without the constraint $\theta \cdot q_1 + q_2 \leq Q_c$. If $Q_{e,1} \leq Q_c - \varepsilon$ holds, the directors' cost minimising decision is to demand *no* internal control and external auditing, since they would be held liable in any case, and would therefore choose not to

incur the internal control cost and the audit fee.¹⁸

In the second case ($j = 2$), when the auditor produces $q^*(q_1, q_2) = 0$, and auditor compliance $g = 0$, that is when q^* is at point P_2 in graph 2, the optimal level of overall quality demanded by the directors, defined as Q_2^* , is given by:

$$Q_2^* = \theta \cdot q_1^* + q_2^* = \min \{Q_c + \varepsilon, Q_{e,2}\} \quad (13)$$

$$= \frac{L s_1}{2 \varepsilon} \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1})$$

if $Q_{e,2} > Q_c - \varepsilon$. If $Q_{e,2} \leq Q_c - \varepsilon$ holds, the directors' cost minimising decision is to demand *no* internal control and external auditing. Note that $Q_{e,2}$ is smaller than $Q_{e,1}$.

When $0 < g(q^*; q_1, q_2) < 1$ holds, the optimisation problem occurs in its most complex form, as g is then a function of (q_1, q_2) .¹⁹ The cost minimising level of overall financial statement quality is defined as Q_3^* and

¹⁸ As in the external auditor's case, this extreme result is due to the fact that L is treated as a constant in the analysis. In reality; however, L is a decreasing function of q_1 and q_2 , and therefore there would be some marginal benefit from demanding a level of quality larger than zero.

¹⁹ i.e. $g(q^*; q_1, q_2) = \frac{1}{2\delta} \cdot \left[\frac{L(s_2 + s_1)}{c_2\delta} - q_2 + \delta \right]$. Note that we assume that $\frac{dg}{dq_2} = 0$ [this implies $(\frac{L s_1}{2 c_2 \varepsilon \delta} = 1)$. That is, as the demanded level of external audit quality increases (or decreases), the auditor's response is to increase (or decrease) the level of audit quality produced proportionally.

$$Q_3^* = \min \{Q_c + \varepsilon, Q_{e,3}\},$$

where

$$Q_{e,3} = \frac{1}{\varepsilon} \cdot \left(\frac{s_1}{2} + s_2 \cdot g^* \right) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) - \frac{L\theta^2 s_2 (1 - f^*)}{\delta c_1}, \quad (14)$$

if $Q_{e,3} > Q_c - \varepsilon$, and equals zero if $Q_{e,3} \leq Q_c - \varepsilon$ holds. Note that $g^* = g(q^*; q_1^*, q_2^*)$, or the value the auditor's compliance function takes at the cost minimising financial reporting system quality demanded, i.e. (q_1^*, q_2^*) ; and $f^* = f(q_1^*, q_2^*)$ is defined as the value the directors' compliance function takes at the cost minimising financial reporting system quality demanded, i.e. (q_1^*, q_2^*) . Comparison of the values $Q_{e,j}$ for each situation, j , reveals that:

$$Q_{e,2} < Q_{e,3} < Q_{e,1}$$

when $Q_{e,j} > Q_c - \varepsilon$ holds. That is, as the precision of GAAS decreases, directors demand decreasing levels of overall financial statement quality and audit quality, *ceteris paribus*. Appendix 1 provides a proof.

5.2.2. The effect of uncertainty, ε , on the directors' decision for alternative levels of auditor compliance (g)

Similar to the analysis in section 5.1, three types of critical values can be defined for the directors' uncertainty, ε , concerning the level of overall financial statement quality which establishes their own due diligence, denoted by ε_u , ε_i , and ε_e . Each type of critical ε -value will however take different values depending on the degree of uncertainty the auditor is facing regarding GAAS, and hence depending on the value g^* takes. Thus for each situation, j , discussed in section 5.2.1, the critical values $\varepsilon_{u,j}$, $\varepsilon_{i,j}$, and $\varepsilon_{e,j}$ will differ.

The critical value $\varepsilon_{u,j}$ is defined as the level of directors' uncertainty at which $Q_j^* = Q_c + \varepsilon = Q_{e,j}$ holds. If $\varepsilon \leq \varepsilon_{u,j}$, the directors will decide to demand quality levels that always comply with the court's norm, and will never be held liable. The critical value $\varepsilon_{i,j}$ is defined as the level of uncertainty at which $Q_{e,j} = Q_c - \varepsilon$, and the directors' decision is that $Q_j^* = 0$. If $\varepsilon \geq \varepsilon_{i,j}$, the directors will certainly not comply with the court's norm. If vagueness about the directors' due diligence standard is such that ε takes a value within the open interval $[\varepsilon_{u,j}, \varepsilon_{i,j}]$, directors will demand a level of overall financial statement quality equal to $Q_{e,j}$ and accept a gamble on their liability. Finally, the critical value $\varepsilon_{e,j}$ is defined as the level of uncertainty at which $Q_j^* = E[Q_c] = Q_c$ holds. Table A.1 in Appendix 2 gives an overview of the critical val-

ues on ε for each situation, j , of assessed auditor compliance, g . From Table A.1 it is clear by inspection that:

$$\varepsilon_{u,1} > \varepsilon_{u,3} > \varepsilon_{u,2},$$

and

$$\varepsilon_{i,1} > \varepsilon_{i,3} > \varepsilon_{i,2}.$$

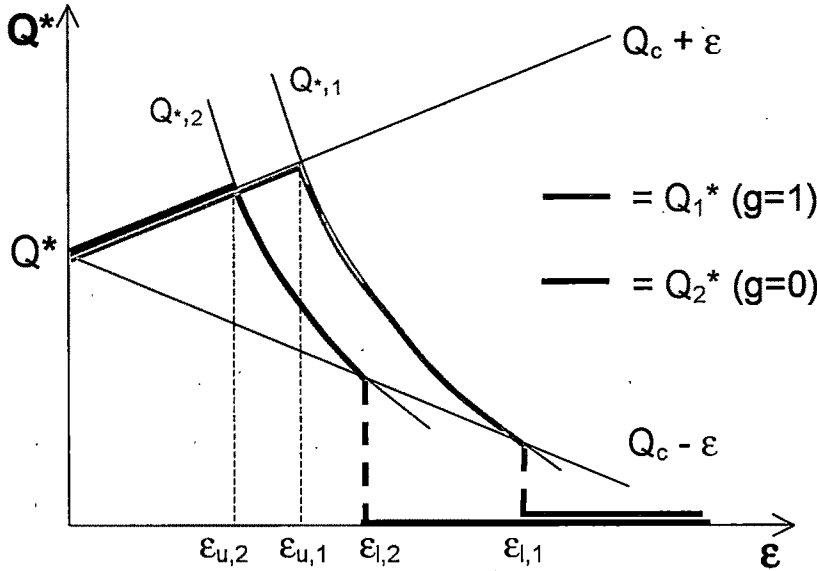
Graph 3 illustrates the directors' choice, Q_j^* , as a function of ε and for the two extreme cases, namely when uncertainty for auditors is small (situation $j = 1$ discussed in 4.2.1 above, where $g = 1$) and large (situation $j = 2$ where $g = 0$). Recall that when auditor compliance is assessed to be zero, the auditors will always be held liable. It is clear from graph 3 that the directors' optimal decision lines Q_j^* are discontinuous at two levels of uncertainty, i.e. $\varepsilon_{u,j}$ and $\varepsilon_{i,j}$, and that these critical values change in j .

Graph 3 also shows that, for any given level of uncertainty, ε , about the directors due care level, Q_2^* will never be strictly larger than Q_1^* ; that is, directors will never demand more overall financial statement quality when uncertainty about the auditors due care level, δ , is large (that is when $j = 2$ such that $g = 0$) than when δ is small (that is when $j = 1$ such that $g = 1$). Uncertainty about the auditor's due care level, however, does not affect the directors' decision when uncertainty about the directors' own due care is either small or large. In graph 3 the Q_1^* and Q_2^* curves then coincide. That is, if $\varepsilon \leq \varepsilon_{u,2}$, the directors' decision is to demand $Q_j^* = Q_c + \varepsilon$ for all situations of auditor compliance, j . If $\varepsilon \geq \varepsilon_{i,1}$, the directors' decision is to demand $Q_j^* = 0$ for all situations of auditor compliance, j .²⁰ If uncertainty about the directors' own due care level is neither large nor small, and is such that $\varepsilon_{u,2} < \varepsilon < \varepsilon_{i,1}$ holds, the degree of vagueness in GAAS affects the directors' decision. When δ is large, such that $g = 0$, directors' will demand either $Q_{e,2}$ or nothing, depending on the value ε takes within that interval. However, when δ is small, such that $g = 1$, the directors will demand $Q_c + \varepsilon$, if $\varepsilon \leq \varepsilon_{u,1}$, or $Q_{e,1}$ if $\varepsilon_{u,2} < \varepsilon < \varepsilon_{u,1}$. Since both $Q_c + \varepsilon$ and $Q_{e,1}$ are larger than $Q_{e,2}$, it can be concluded for any level of directors' uncertainty ε within the interval $[\varepsilon_{u,2}, \varepsilon_{u,1}]$ it holds that $Q_2^* < Q_1^*$.

Note that not only $Q_2^* < Q_1^*$ holds when $\varepsilon \in [\varepsilon_{u,2}, \varepsilon_{u,1}]$. The levels of both internal control and external audit quality demanded will be larger when GAAS are precise (and $g = 1$) than when GAAS are uncertain (and $g = 0$). This can be concluded from Table A.2 in Appendix 3, which gives a summary overview of the directors' decision on Q_j^* , $q_{1,j}^*$ and $q_{2,j}^*$ and the auditor's decision on q^* for alternative combinations of levels of ε and δ .

When the auditor's uncertainty, δ , is such that $0 < g^* < 1$ holds, the $Q_{e,3}$ curve will be located

²⁰ This result also holds for situation 3 where $0 < g^* < 1$ holds, since $\varepsilon_{u,3} > \varepsilon_{u,2}$ and $\varepsilon_{i,3} < \varepsilon_{i,1}$ holds (see Table A.1 in Appendix 2)

Graph 3**The directors' choice as a function of vagueness in due care standards, ϵ** 

somewhere in between the $Q_{e,2}$ curve and the $Q_{e,1}$ curve in graph 3. The exact shape and location will depend on the size of the optimal g^* . If $\epsilon \in]\epsilon_{u,3}, \epsilon_{l,3}[$, the directors' choice will be smaller than when $g = 1$, but larger than when $g = 0$.

Proposition 3.

When the uncertainty about the due care level applying to the directors is sufficiently small,²¹ uncertainty about GAAS (the degree of imprecision in GAAS) does not affect the directors' quality decision, and directors will demand a level of overall financial statement quality such that they comply with certainty with the due care level.

Proposition 4.

If uncertainty about the directors' due care level is sufficiently large,²² and if imprecision in GAAS is so large that auditors are liable with certainty,²³ directors will demand less overall financial statement quality and external audit quality than when auditors are not liable with certainty.²⁴

The intuition behind Proposition 4 is as follows. When auditors are liable with certainty, the direc-

tors' expected damage payments decrease, and the marginal benefit from demanding external audit services is lower at all feasible levels of demand. A lower level of audit quality demanded is the result.

6. Empirical predictions and possible tests

The analyses and related propositions concerning the effects of varying degrees of vagueness or imprecision in GAAS and varying vagueness or imprecision in legal standards of due care that apply to directors developed in the previous sections of the paper, yield the following hypotheses:

H₁: Decreasing the precision of GAAS, given that the imprecision of due care standards for directors is beyond a certain critical value, decreases overall financial statement quality, the quality of internal controls, and the quality of external auditing demanded.

H₂: Beyond a certain critical value, decreasing the precision of GAAS decreases the quality of external auditing produced (auditor effort) relative to the audit quality demanded.

H₃: Beyond a certain critical value, decreasing the precision of GAAS increases the probability that the auditor will be found in non-compliance with GAAS (i.e. negligent).

To test these hypotheses, it is necessary to iden-

²¹ By this it is meant that $\epsilon \leq \epsilon_{u,2}$.

²² By this it is meant that $\epsilon > \epsilon_{u,2}$.

²³ By this it is meant that δ is such that $g = 0$. If $g = 0$, external auditors are believed to be always held liable. Therefore they can be seen as insurers.

²⁴ Unless $\epsilon \geq \epsilon_{l,1}$, then $Q^*_1 = Q^*_2 = 0$.

tify contexts where the precision of GAAS varies systematically. Three possible approaches to such tests involve 1) international comparisons, 2) inter-industry comparisons and 3) inter-temporal comparisons.

6.1. International comparisons

As noted earlier, the US *Statements on Auditing Standards* and related PCAOB auditing standards are generally recognised as being more detailed and precise than auditing standards in any other country. In addition, GAAS in the industrialised countries (e.g. the Group of Seven, the countries of the European Union), many of which have essentially adopted the *International Standards on Auditing (ISAs)*, are likely to be more precise than standards in developing countries (e.g. China) that are in the process of developing effective auditing institutions. Of course, the assessment of degree of precision in standards by a researcher should reflect the circumstances relating to a country at the time of a study. Since audit quality choice is observable in the choice of auditor class (Big 4 vs. non-Big 4), H1 implies that Big 4 firms' overall audit market shares should be positively correlated with the precision of countries' auditing standards.

Note that international comparisons are subject to a potentially serious correlated omitted variables problem. For example, the legal environment, the development of capital markets, and the degree of enforcement of standards likely also vary systematically across these areas (see, for example, La Porta et al., 1997). These omitted factors can also affect both the demand and supply of audit quality, and would need to be controlled.

Some evidence concerning H2 could be obtained by comparing the audit fees charged by Big 4 firms for clients of given size across countries where the precision of GAAS varies. The argument here is that restricting the evidence to the Big 4 firms controls for audit quality, while actual audit fees (for clients of given size) measure the level of effort.

Finally, international comparisons of litigation rates facing the Big 4 firms could provide evidence related to H₃. The argument is that auditors will be motivated to reduce their effort level and gamble on violating (or knowingly violate) GAAS, the lower is the precision of GAAS. Again, focusing on Big 4 firms controls for the level of audit quality demanded. The proportion of audits performed where a Big 4 auditor is found to be negligent *ex post* would be an appropriate litigation rate measure, and these rates should be negatively correlated with the degree of precision of countries' auditing standards.

A test of H₃ comparing Big 4 litigation rates across countries will be influenced by the fact that the 'onerousness' of litigation regimes from an au-

ditor's perspective also varies across countries (see Wingate, 1997). However, the effect of differences in legal regimes on litigation rates is unclear. A more onerous regime will tend to increase investors' and creditors' propensity to sue (increasing litigation rates) while also increasing auditors' effort levels as a defensive measure (decreasing the rate of successful litigation).

6.2. Inter-industry comparisons

Another approach to testing our hypotheses is to compare auditor choice, auditor effort levels, and litigation rates across audits in different client industries where the precision of GAAS varies. The advantage of using inter-industry comparisons is that data can be restricted to one country, thereby controlling for many potential confounding factors. The difficulty is to identify systematic differences in the precision of auditing standards across industries. A reasonable solution is to consider the client industries where professional accounting bodies have deemed it appropriate to publish additional detailed guidance (beyond generic standards) as having relatively more precise GAAS.

6.3. Inter-temporal comparisons

A third general approach to testing our hypotheses is to make comparisons of auditor choice, auditor effort, and auditor litigation rates over time in a country that changes the precision of its auditing standards. For example, the adoption of ISAs by the EU in 2005 likely changed the precision of standards in some countries. An appropriate test would be to make relevant comparisons before and after these changes. As with inter-industry tests, inter-temporal comparisons would control for many extraneous factors while allowing larger sample sizes and thus more powerful tests to be constructed. This seems a useful area for future research as we know of no existing tests of this type in published work.

7. Conclusions

This paper examines the effects of imprecision in due diligence standards that apply to corporate directors (i.e. legal standards) and to external auditors (i.e. GAAS) on the demand and supply of overall financial statement quality (i.e. the probability that audited financial statements contain material misstatements), internal control quality, and external audit quality. We note that when the due care standards applying to directors and external auditors are precise and the penalty for violations is sufficiently large, both auditors and directors will comply with the standards. Uncertainty about the respective due care levels of directors and external auditors changes both parties' behaviour.

A relatively small degree of imprecision in GAAS causes an auditor to exert more effort,

thereby increasing the quality of auditing produced. As GAAS become more imprecise, the auditor exerts less effort and risks being held liable to third parties. With extremely imprecise GAAS, the auditor does nothing, and simply bears the legal consequences. In situations where the auditor risks being held liable to investors (or is liable with certainty), the audit fee incorporates an expected loss or 'risk premium'.

When uncertainty about the directors' due care level is minimal, the degree of imprecision in GAAS and the resulting behaviour of the auditor are irrelevant to directors. Directors will always demand a level of financial statement quality such that they comply with due care standards with certainty. For larger levels of uncertainty about the directors' due care level, the precision of GAAS becomes relevant to the director's demand decision. Our analysis shows that in this situation a lower level of external audit quality is demanded as auditing standards become more imprecise. This is because reducing the precision of GAAS motivates auditors to produce a lower level of audit quality (i.e. exert less effort). When external

audit quality production is low, cost minimising directors will demand less external auditing.

The analyses in the paper yield several potentially testable empirical implications

for auditor choice, auditor effort, and auditor litigation rates as the vagueness of GAAS varies. However, designing such tests will be challenging since both international and inter-industry comparisons must (somehow) control for the many extraneous differences across countries and industries. A useful alternative approach may be to compare auditor choices, effort, and litigation rates over time within a country that changes the precision of its auditing standards.

To conclude, we believe that the relative precision of auditing standards is an important factor that interacts with the litigation environment to influence the behaviour of auditors and company directors, hence the supply of and demand for audit services. Given these effects, understanding the consequences of varying precision in standards should be important not only to auditors, but also to standard setters who seek to understand the economic consequences of their activities.

Appendix 1

We need to prove that: a) $Q_{e,1} > Q_{e,2}$, b) $Q_{e,1} > Q_{e,3}$, and c) $Q_{e,3} > Q_{e,2}$. It is clear from inspection that conditions a) and b) hold since:

$$\frac{L}{\epsilon} \cdot \left(\frac{s_1}{2} + s_2\right) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) > \frac{L}{\epsilon} \cdot \frac{s_1}{2} \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}), \text{ and} \quad (\text{A.1})$$

$$\frac{L}{\epsilon} \cdot \left(\frac{s_1}{2} + s_2\right) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) > \frac{L}{\epsilon} \cdot \left(\frac{s_1}{2} + s_2 \cdot g^*\right) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) - \frac{L\theta^2 s_2(1-f^*)}{\delta c_1} \quad (\text{A.2})$$

because all parameters take non-negative values, and $0 < g^* < 1$ in exp. (A.2). For condition c) to hold, the following must be true:

$$\frac{L}{\epsilon} \cdot \left(\frac{s_1}{2} + s_2 \cdot g^*\right) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) - \frac{L\theta^2 s_2(1-f^*)}{\delta c_1} > \frac{L}{\epsilon} \cdot \frac{s_1}{2} \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}), \quad (\text{A.3})$$

Since the second term on the left hand side of the inequality sign is negative, it could well be that for some combinations of parameter values condition A.3 is not fulfilled, and:

$$\frac{L}{\epsilon} \cdot \left(\frac{s_1}{2} + s_2 \cdot g^*\right) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) - \frac{L\theta^2 s_2(1-f^*)}{\delta c_1} < \frac{L}{\epsilon} \cdot \frac{s_1}{2} \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}), \quad (\text{A.4})$$

would hold. However the latter situation could never coincide with a feasible solution to the cost minimisation problem. Let $q_2^*|_{g^*=0}$ be the value q_2^* takes in situation 2 (when $g^* = 0$); $q_2^*|_{0 < g^* < 1}$ be the value q_2^* takes in situation 3 (when $0 < g^* < 1$); $q_e|_{g^*=0}$ be the value q_e takes in situation 2 (when $g^* = 0$); and $q_e|_{0 < g^* < 1}$ be the value q_e takes in situation 3 (when $0 < g^* < 1$).

If (A.4) holds, then $Q_{e,2} > Q_{e,3}$ is true [i.e. the overall financial statement quality demanded would be larger when auditor compliance is zero than when it takes a value between zero and one]. However, $q_2^*|_{g^*=0} < q_2^*|_{0 < g^* < 1}$ (i.e. external audit quality demand is smaller when auditor compliance is zero than when it takes a value between zero and one). This is clear from inspection of Table A.2 in Appendix 2 [i.e. $\frac{L}{\epsilon c_1} \cdot \frac{s_1}{2} < \frac{L}{\epsilon c_2} \cdot \left(\frac{s_1}{2} + s_2 \cdot g^*\right)$]. Hence, *ceteris paribus*, $q_2^*|_{g^*=0} - \delta < q_2^*|_{0 < g^* < 1} - \delta$ must also hold. Should $Q_{e,2} > Q_{e,3}$ be true, then, *ceteris paribus*, $f_2^* > f_3^*$. Now if $f_2^* > f_3^*$, then $q_e|_{g^*=0} > q_e|_{0 < g^* < 1}$, since $q_e = \frac{L}{\delta c_2} \cdot [s_2 + s_1 \cdot f^*]$. However, in situation 2 auditor compliance, g^* , equals zero in equilibrium, which implies that $q_e|_{g^*=0} < q_2^*|_{g^*=0} - \delta$. Since $q_2^*|_{0 < g^* < 1} - \delta > q_2^*|_{g^*=0} - \delta$ and $q_e|_{g^*=0} > q_e|_{0 < g^* < 1}$, it follows that, *ceteris paribus*, auditor compliance, g^* , would take a value strictly smaller than zero in situation 3 – which is not feasible – should $Q_{e,2} > Q_{e,3}$ be true. Therefore $Q_{e,2} > Q_{e,3}$ cannot be a feasible solution to the minimisation problem in situation 3.

Appendix 2

Table A.1

Critical values on ϵ for alternative situations of assessed auditor compliance, g

Critical ϵ -value	Formula	Corresponding value for g
$\epsilon_{u,1} =$	$\frac{1}{2} \cdot [-Q_c + (Q_c^2 + 4L \cdot (\frac{s_1}{2} + s_2) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}))^{1/2}]$	$g = 1$
$\epsilon_{u,2} =$	$\frac{1}{2} \cdot [-Q_c + (Q_c^2 + 4L \cdot (\frac{s_1}{2}) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}))^{1/2}]$	$g = 0$
$\epsilon_{u,3} =$	$\frac{1}{2} \cdot [-Q_c + (Q_c^2 + 4L \cdot (\frac{s_1}{2} + s_2 \cdot g^*) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) - A)^{1/2}]$	$0 < g < 1$
$\epsilon_{l,1} =$	$\frac{1}{2} \cdot [Q_c - (Q_c^2 - 4L \cdot (\frac{s_1}{2} + s_2) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}))^{1/2}]$	$g = 1$
$\epsilon_{l,2} =$	$\frac{1}{2} \cdot [Q_c - (Q_c^2 - 4L \cdot (\frac{s_1}{2}) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}))^{1/2}]$	$g = 0$
$\epsilon_{l,3} =$	$\frac{1}{2} \cdot [Q_c - (Q_c^2 - 4L \cdot (\frac{s_1}{2} + s_2 \cdot g^*) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1}) - A)^{1/2}]$	$0 < g < 1$
$\epsilon_{e,1} =$	$(\frac{L}{Q_c}) \cdot (\frac{s_1}{2} + s_2) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1})$	$g = 1$
$\epsilon_{e,2} =$	$(\frac{L}{Q_c}) \cdot (\frac{s_1}{2}) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1})$	$g = 0$
$\epsilon_{e,3} =$	$(\frac{L}{Q_c} + A) \cdot (\frac{s_1}{2} + s_2 \cdot g^*) \cdot (c_2^{-1} + \theta^2 \cdot c_1^{-1})$	$0 < g < 1$

Note: $A = \frac{L\theta^2 s_2(1-f^*)}{\delta c_1}$.

Subscript 1 represents the critical values when $g^* = 1$, subscript 2 represents the critical values when $g^* = 0$, and subscript 3 represents the critical values when $0 < g^* < 1$.

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Comments on deprival value and standard setting in measurement: from a symposium to celebrate the work of Professor William T. Baxter

Edited by Pauline Weetman

Note. The opinions that appear in this Comment are the personal views of the respective contributors to this Comment and not those of their employers or affiliates.

1. Editorial introduction

In July 2006 the London School of Economics (LSE) hosted a Symposium to celebrate the work of Professor William T. Baxter. The influence and continuing significance of Baxter's work was discussed by experts from a range of academic and practitioner perspectives on the nature, relevance and usefulness of the concept of deprival value, with some views on the direction to be taken in setting measurement standards. In introducing their views, each speaker paid particular tribute to Baxter and then discussed a personal perception of the influence of his work. This summary of their presentations is offered as a comment on, and celebration of, the relevance of Baxter's work in the expectation that the various perspectives will provide useful ideas for those whose research relates to the current debates on measurement and standard setting in accounting.

The comments begin with three retrospective analyses. Sir Ian Byatt, past Director General of the Office of Water Services, spoke on deprival value and its use in the utilities. Peter Holgate, senior technical partner at PricewaterhouseCoopers, reviewed the uses of deprival value in previous periods when inflation accounting was higher on the agenda. Professor Michael Bromwich, of the Department of Accounting and Finance at the London School of Economics, noted Baxter's central role in the sequence of very active development of theories of accounting measurement. With a focus on the present, Professor Shyam Sunder of Yale University reflected on Baxter's perception of the role of accounting standards. Dr Joanne Horton, senior lecturer in the Department of Accounting and Finance at the London School of Economics, outlined continuing debates on deprival value and relief value. Professor Ken Peasnell of Lancaster University reviewed the position of deprival value today. Professor Richard Macve of the London

School of Economics drew the discussion to a close. The editor is grateful to an anonymous reviewer for suggestions on presenting this series of comments.

2. Sir Ian Byatt: deprival value and its use in the utilities

William Baxter established the principle of deprival value in modern day accounting. I will illustrate its use in nationalised and privatised utilities in the UK. I will show how it was critical to setting an initial regulatory capital value.

When setting out the principles for asset valuation, Baxter argued that the basis selected should bear in mind 'the nature of the assets or liabilities concerned and the circumstances involved'. My task today is to talk about how my colleagues and I, working in the utility field (mainly as regulators or quasi-regulators) have applied, and tried to apply, these principles. My most recent example comes from my work this week. On Monday, I was a member of a three-man expert panel advising a national utility regulator. A key task was to advise on the regulatory capital value of the publicly owned electricity company. So far, the various parties have got into analytic complications that are generating a great deal of heat. Our task is to find a way ahead that can enable the parties to move in a systematic way to price control decisions that would cover the next six years. I believe that Baxter's work on deprival value will help us in this task. All three of us are economists and found ourselves in discussion with a chartered accountant; I am glad to be able to tell you that I successfully disarmed him by referring to Baxter and his work.

The story of my involvement with deprival value goes back a long way – to the days when I was working in the Treasury on matters concerning nationalised industries. (The Government did not, of

course, regulate nationalised industries, it sponsored them, but the Treasury at least tried to maintain some kind of financial discipline.) This financial discipline was constantly subject to stress, for a variety of day-to-day reasons, some connected with ministerial activity or inactivity, and some concerned with the behaviour of the industries themselves. In 1961, in 1967 and again in 1976, the Treasury took major steps to embed better discipline in the system of control. In 1961, the government established a system of financial targets, to ensure five-year break even on Revenue Account, supplementary depreciation to cover inflationary erosion of historical cost accounting depreciation and a current contribution to future capital investment. But the issues of a rate of return on all assets and their capital value were not addressed. In 1967 economics ruled, with the use of discounted cash flow investment appraisal and marginal cost pricing. Accounting costs were to be covered, but nowhere was there any discussion of what that might mean.

In 1976, the Treasury moved back towards looking at overall returns rather than returns on projects, and at overall long run prices rather than at prices of specific services. It developed the notion of a required rate of return to be applied to the future capital programme as a whole. But the important issue of the return on existing assets was not addressed. This latter issue was first explored officially in the first part of the 1980s, when a group of accountants and economists came together to advise the Treasury on the use of accounting policies in achieving a proper return on nationalised industry capital. In this group, we used deprival value as the correct approach to asset valuation, linking it to the need to make an appropriate return on assets after maintaining real financial capital. This was heady stuff, and met plenty of opposition, not least from the nationalised industries themselves. It was intellectually challenging and intellectually productive. But it was not tested in practice. Who knows what would have resulted had privatisation not intervened! I am glad to say that privatisation turned out to be an ideal opportunity to establish these modern accounting practices in the utilities, and to give them a crucial role in the properly recording of facts and in the process of decision making.

Because of the need to protect property rights in existing assets, regulatory capital values needed to be established. The principles of deprival value, as set out by Will Baxter, were the tools for the job. The starting capital value was the capitalised earning power of the assets, as established in the mar-

ket. Sale value provided a good measure of deprival value. This could then be rolled forward to allow for new investment and for depreciation. Returns to these capital values were measured on a financial capital maintenance basis. Because the regulatory regimes were 'inflation proofed', i.e. operated through price caps based on a retail price index (the version known as 'RPI-X' which excluded housing mortgage interest costs), regulatory accounts were specified in current cost terms. The combination of looking forward at costs and backward at performance was a winning combination. The regulatory accounts monitor the results of the price setting. These accounts must link to the forward looking financial model. If not, confusion inevitably arises. At Ofwat¹ in the 1990s, where I can speak with most authority, the monitoring of the return on the regulatory capital value in the regulatory accounts was a key element in regulatory policy. It was also a major element in explaining to all the interested parties (stakeholders – including customers, the regulated companies, the financial markets and the public generally) what was going on and so influencing expectations as to future regulatory action. Simple numbers are the key to good communication, to establishing proper incentives and to making good decisions. But simple numbers are not constructed simply, nor constructed on intuitively obvious principles.

Sir Ian Byatt concluded with appreciation of the lead given by Professor Baxter in setting a practical and intellectually robust route, enabling the development of regulation on a sound accounting basis, and for explaining the principles clearly and elegantly, for reminding us to look at the circumstances involved, for keeping the complications in their place and for relating what he said and wrote to the real business issues requiring attention.

3. Peter Holgate: uses of deprival value

I have been asked to say a few words about deprival value from the perspective of accounting standard setters in the UK. From my time on the technical staff of the Accounting Standards Committee (1981 to 1986) and more recently as a practitioner, I have followed this subject with some interest. As we know, deprival value is defined as the lower of current replacement cost and recoverable amount (Baxter called this 'future contribution'). Recoverable amount is the higher of value in use (net present value of cash flows) and net realisable value. Deprival value has been much championed by Will Baxter, though he acknowledges that 'the concept was probably first discussed in depth by Professor J.C. Bonbright of Columbia University'. Baxter (1984), in a work on inflation accounting, notes that 'it [deprival value] has been tacitly adopted by the British Standard

¹ The Water Services Regulation Authority (Ofwat) is the economic regulator of the water and sewerage industry in England and Wales. <http://www.ofwat.gov.uk>

setters, but is sadly neglected in the USA'. Deprival value has indeed been used by UK standard setters extensively, though not by that name. It was generally called 'value to the business' or 'current cost'. As such, it featured in the Sandilands Report (HMSO, 1975), the Exposure Drafts ED 18 (ASC, 1976) and ED 24 (ASC, 1979) and the Statement of Standard Accounting Practice SSAP 16 (ASC, 1980). It also featured in the Accounting Standards Committee's *Accounting for the effects of changing prices – a handbook* (ASC, 1986). During the 1990s it found its way into the Accounting Standards Board's *Statement of Principles* (ASB, 1999).

Of course, the inflation accounting story in the UK was not exactly a happy one. In the mid and late 1970s, there was high inflation which was seen to be distorting the measurement of profits and assets. Although there was some agreement that this was a problem, there was little agreement as to what should be done about it. For one thing there was the dispute about whether to use Current Purchasing Power (CPP) or Current Cost Accounting (CCA) – i.e. general inflation restatement or accounting for specific price changes. CCA 'won the day' but its day lasted, as it were, only for a few years. After Sandilands and two exposure drafts, SSAP 16 was put in place. It never was popular and, although there was initially good compliance with it, a few refused and gradually more and more companies joined them, rendering it unenforceable. There was really no effective enforcement regime at the time. Eventually, by about 1984, SSAP 16 had to be withdrawn. Of course that does not mean it was in any sense wrong – SSAP 16 had to be withdrawn for wider reasons. It was not the case that people disagreed with deprival value (or current cost) as a basis for measuring assets. It was because of objection to the inflation accounting proposition as a whole; its complexity; the lack of understanding by companies and users; the effect of reducing profits – not popular with finance directors and even less popular with chief executive officers; the fact that tax was levied on an historical cost basis; and the fact that inflation was high in the mid and late 1970s but started to reduce in the 1980s.

In the downfall of SSAP 16 there was no significant objection, as I recall, to the notion of deprival value. Indeed today, when assets are revalued selectively, the deprival value notion plays a major part. For example, the revaluation model of the International Accounting Standard IAS 16 *Property, Plant and Equipment* requires that assets are stated at 'fair value at the date of the revalua-

tion, less any subsequent accumulated depreciation and subsequent accumulated impairment losses' (IASB, 2007: para. 31). Time does not permit a discussion of fair value and what that means (for example the US standard setters are currently re-engineering it to mean exit value, i.e. likely disposal proceeds), but we can see part of deprival value in the words 'less impairment losses'. Indeed, deprival value is central to the UK and IFRS approach to impairment (whether the asset is at cost or at value of some kind). A discussion paper on *Measurement at Initial Recognition* (IASB, 2005) analyses a number of options and included on page 61 is deprival value. Nor is its use confined to assets. Baxter's model in the context of liabilities is called 'Relief Value'. Andrew Lennard, as technical director of the UK Accounting Standards Board (ASB) has published a paper on *Liabilities and how to account for them* (Lennard, 2003). So we can safely say that Baxter's ideas live on in many ways – in relation to liabilities as well as to assets and, perhaps more importantly, in North America and on the international scene as well as in the UK.² To be fair, much of this 'living on' is in institutes and standard-setters, as well as in universities. But it also lives on in what passes for the real world. I was giving a seminar to some non-executive directors recently – mostly about the development of International Financial Reporting Standards – and in the 'questions and answers' session one of them asked me whether any work was taking place on inflation accounting. He pointed out that inflation was currently low but might not always be. Was there any contingency plan for inflation accounting? I had to acknowledge that it had received very little attention in these recent years – due largely to low inflation. What attention there had been was centred on financial instruments and pensions, in contrast to the focus of SSAP 16 *Statement of Standard Accounting Practice* (ASC, 1980) on non-financial assets such as plant, equipment and inventories. I also had to acknowledge that if it did recur, there would be a whole generation of accountants and business people asking – as if for the first time – questions about how to account for inflation. I wonder where they will look for guidance?

4. Professor Michael Bromwich: the summit of accounting theory

Professor Bromwich summarised the range of normative theories of valuation that were developed, debated and discussed over several years. He described the debate, played out in books of exemplary analytical standard as 'the battle of the ought-to'. The theories drew on social sciences, principally economic analysis. As examples, historical accounting was supported by Ijiri. (1975) while the concepts underpinning historical cost

² Editor's note: See also van Zijl and Whittington (2006) and Walton (2006) for recent contributions to the debate in this journal.

accounting were analysed by Paton and Littleton (1940). Exit values were supported by MacNeal (1939), Chambers (1966) and Sterling (1979). Entry values, based on replacement cost, were favoured by Edwards and Bell (1961). Opportunity cost, which featured prominently in Baxter's discussions, is found also in Canning (1929). The concept of deprival value as a means of reconciling positions on exit prices and entry prices, depending on the choices available to entities, is described by Solomons (1966) and Baxter (2003) drawing on principles set out by Bonbright (1937) whom Baxter had visited. Bromwich pointed out that the authors of these works, including Baxter, thought about value throughout their working lives. There is an irony that those who could influence standard setting, particularly the Financial Accounting Standards Board in the US, appear to prefer that management judgment should not have a role in the measurement of assets and liabilities. Professor Bromwich concluded with the view that we need the judgment of managers in valuation.

5. Shyam Sunder: not by Will – Baxter and the rise of authoritative accounting standards

Scholars retain their perspective in the face of opposition, ignorance, fashion-of-the-day, even prejudice. Access to the ears of princes rarely helps either the scholarship or the authority. William T. Baxter was among the first, if not the first, to recognise and articulate the deleterious consequences of authoritative measurement standards for accounting as a profession, academic discipline, and subject of university instruction. Yet, his career coincided with the rise of such standards. Today, as we stand at the verge of global triumph of standards and authority over individual analysis and judgment in accounting measurement, doubts about the wisdom of this approach are beginning to take hold. Baxter would be too gracious to have the last laugh.

Unlike most people here, I did not have the opportunity to study as Will Baxter's student. I met him a few times during his visits to the United States and my visit to the London School of Economics. I know him mostly from his writings, especially about the role of authority in setting and enforcing accounting standards. In these remarks, I would like to outline how his writings have affected my own thinking and work.

First, Baxter was not opposed to accounting standards per se. He recognised the value, indeed the necessity, of many kinds of standards to make our life, in accounting and elsewhere, easier and tolerable. Rules of the road – drive to the left (or right, as the case may be) is a familiar example.

Life would be difficult without the coordination

facilitated by standards. In a recent working paper, Karim Jamal of the University of Alberta and I (Jamal and Sunder, 2006) found that in the US alone there are more than 500 standard-setting organisations and more than 15,000 standards developed by these organisations are in place. We take for granted the convenience of standards for voltage of electrical power, internet protocols, even height of the tables and chairs in this room. Better coordination of our activities is prized in human societies. Standards serve that function in all walks of life. Financial accounting standards are just a special case.

What, then, were Baxter's reservations about standards? He was skeptical, even critical, of measurement standards backed by the enforcement power of authority. There is no compelling reason for a single theory or conceptual framework for financial reporting – whether it is fair value or stewardship – to receive the imprimatur of authority over others (FASB, 2006). Theories must be left for open debate and judgment to be resolved by logic and evidence, not authority. Baxter, worried about the deleterious effects of authoritative pronouncements on the nature of practice, scholarly debate, content of text books, classroom disclosure, and ultimately on the quality of talent that might be attracted to a profession which is reduced to a search of the rule book. Search engines are free, and so will be the ultimate value of the services of an accountant stripped of the freedom to contemplate and exercise judgment.

Although Baxter wrote his analysis more than half a century ago, his words sound incredibly prescient today:

'Similarly, official recommendations by an institute of engineers would have to be framed with some care. Assume, for instance, that it advised its members to build bridges in a uniform way, based on the best current knowledge. For a while, standards might well be raised. But research would in time point to better bridges; nonconformist bodies of engineers would be free to build these, while the orthodox would be denied the fruits of advancing science.

'... Authority may thus rest (at one end of the scale) on prestige only, and (at the other) on power. Occasionally the brilliance of a single thinker can cause his views to be treated with deference. A close-knit school of able thinkers may well dominate opinion to an unhealthy point – even if they lack organisation and can impose no sanctions. The harm becomes vastly more formidable when the authority controls education, or can mould adult opinion. It reaches its worst when authority has total power. In its extreme forms, we are all agreed that it is evil – and that the evil persists whether or not the

views that it promulgates happen to seem true or false.' (Baxter, 1951, in Baxter and Davidson, 1962: 421–2)

Second, Baxter understood all too well the false dichotomy of positive and normative research, and the unhealthy consequences of the dichotomy for a discipline like accounting that must keep one leg in social sciences and the other in engineering. Starting from the 1950s criticism of management programmes in the US as a wasteland of vocationalism, the pendulum of scholarship swung towards social sciences to the present state in which policy research has become a dirty word in some accounting circles. Baxter's second concern was a judicious balance between scientific aspects of accounting and the policy implications of what we do. We cannot risk being just social scientists, nor just prescribers. In the domain of business, we must bear the burden of doing both – the physics as well as engineering of management and accounting.

This approach is illustrated beautifully by the inclusion of Jack Kitchen's article 'Costing Terminology' in Baxter and Davidson (1962). Kitchen (1954) pointed out simply, but brilliantly, how meaning in language must depend on uncertainty. The value of a word – 'cat' or 'house' or 'assets' – would be lost if it could only be used for exactly identical objects. 'House,' for example, is a general concept, referring to a variety of existing and not-yet-conceived-of constructions. Whether the word 'house' is to be used for a particular construction must necessarily remain a matter of judgment of the speakers. This centrality of judgment and variation in usage is the essence of all natural languages. When we strip the language of ambiguity and variation in meaning, we reduce it to something artificial and sterile (Fearnley and Sunder, 2006). The logic as well as the social science of linguistics leads to deep skepticism about the value of officially declared definitions by accounting institutes that Kitchen criticised. The value of the Oxford English Dictionary derives not from its enforcement authority but from its encyclopedic inventory of usage of words in the past and present. Dictionaries compete for our allegiance in a world with less than perfect coordination of speech. English dominates the world today not because an official academy defines and enforces correct usage, but because of its flexibility and openness to new words and new usages of old words.

Finally, I would like to mention Baxter's deep concern about the impact of authoritative standards and definitions on education and attracting

talent to the accounting profession. He wrote:

'The recommendations³ must therefore have a considerable influence on the thought of the mature accountant. On the immature mind – that of a young man in training – their impact must be deep. They are given conspicuous place in his textbooks and correspondence courses, and so play a large part in moulding his views when he is still impressionable and uncritical. They naturally appeal to the feeble type of teacher, who finds it easier to recite an official creed than to lead a brisk argument. Even before the days of recommendations, accounting textbooks and teachers preferred in general to state facts rather than explore theories. Their main concern was painstaking description of normal practice; scant space was accorded to the reasoning behind the practice, and next to nothing was said of controversy. This dull and sterile approach has now been made far more likely. If an official answer is available to a problem, why should a teacher burden his examination candidates with other views?' (Baxter, 1951, in Baxter and Davidson, 1962:422–3)

Fortunately, as their more recent proposals suggest (FASB, 2006), the Financial Accounting Standards Board and the International Accounting Standards Board may yet benefit from Baxter's thought.

6. Joanne Horton: continuing debates over deprival and relief value

It is an honour to have been invited to contribute today to this Symposium celebrating the work of Will Baxter. Although I was never his student I feel as though he was one of my most important teachers, as everything I learned about financial accounting and reporting in my degree at Aberystwyth centred on Hicks and deprival value. And now I find myself teaching the MSc students here at LSE the equivalent of the 'valuation theory' course that Baxter used to teach them: we still teach Hicks and deprival value.

Why is the concept so basic and so important? Because it links asset values to the underlying Hicksian notion of 'well-offness' in terms of the value of expected future cash flows: which in turn links to the finance that our students are also learning. And although Baxter himself was, in recent years, dubious about treating the 'relief value' of liabilities as the mirror image of the 'deprival value' of assets, at least some of the important insights surely do carry across, as may some of the weaknesses, e.g. how to deal with 'aggregation' or what standard setters now call 'unit of account' problems.

Standard setters currently seem much more interested in 'fair value'. And of course in deep mar-

³ Baxter is referring here to accounting recommendations of a professional accountancy body which might today be equated with accounting standards.

kets like those for many financial instruments, as deprival value is always limited by entry and exit values and in good markets those values increasingly converge, then for financial instruments at least there may not be much practical difference in thinking of 'fair values' rather than deprival or relief values. But as Richard Macve and I pointed out (Horton and Macve, 2000) – in an article which our MSc students seem to find helpful – there are grave theoretical inadequacies from pursuing fair value, particularly in the case of liabilities.

One well-known difficulty arises from changes in creditworthiness. Other things being equal, if a company that has issued a liability instrument such as a debenture has its credit rating downgraded, the price of that debenture on the capital market will fall. Under 'clean surplus' accounting a fall in a value of a liability must give rise to a recognised gain. Is the company really better off? It seems counter-intuitive, even though the usual explanation is that it represents the increasing value of the shareholders' 'limited liability put option' as the company's perceived probability of loan default increases. What is missing of course is the effect of the credit downrating on, possibly, the company's asset values and, certainly, its unrecorded goodwill. These must surely greatly outweigh the apparent gain on its recognised liabilities, so that equity value has declined and it has a loss. In other words to get to the sensible answer, one really needs to ask the underlying question behind the deprival value approach: 'how has the present value of the company's future cash flows been altered'?

Even without the creditworthiness problem, one also needs to go beyond the kind of deprival value examples that mainly feature in Baxter's books, where market interest rates normally are assumed to be unchanging. If interest rates rise, the values of liabilities fall. Again, clean surplus accounting implies a gain to equity shareholders but clearly the rate now implicit in the loan at the new value is higher, so future years' income statements will suffer accordingly. Moreover, while exit value (or fair value) seems to offer only one solution, deprival or relief value, even if producing the same number for the liability, will make us think twice before recognising any gain. Indeed, if the loan is anyway due to be redeemed at some set date in the future, the company must, other things being equal, now be *worse* off since, when that day comes, any refinancing must now be at a higher rate. It is not necessarily the case that the present value of future cash flows has worsened but that certainly the company's 'maintainable cash flow' (and therefore maintainable dividend to its share-

holders) has fallen. So we need to look rather at Hicks' 'No. 2' version of income. The crucial thing is that thinking about value from this perspective, as deprival or relief value does, is making us ask the right questions about 'what difference does it make?', that fair value sweeps under the carpet. It asks the questions that managers should be asking about how to maximise NPV and how to deploy assets and structure liabilities to do so.

Finally, what happens when we move away from the relatively deep markets of traded financial instruments to the much thinner markets for liabilities like insurance liabilities – a particular research interest of mine? Standard setters in their mission for 'fair value' now have been obliged to construct a 'hierarchy' of methods for arriving at fair value as the availability of reliable market benchmarks declines.⁴ At the lower levels of such a hierarchy one is, albeit reluctantly, effectively at the level of manager's own estimates of the future cash flows to be obtained from an asset (or to be met in respect of a liability). Deprival value/relief value thinking accords such estimates their proper place: they are always relevant to managers' decisions, but can only be relevant to value (in the case of an asset) where there is no lower replacement cost. It is presumably relevant in the case of a liability where taking on an equivalent obligation would now bring in a lower cash receipt. This argument supports the position that the IASB's insurance working party was until recently increasingly, but still controversially, moving towards a position where insurance policy liabilities would have to be measured by reference to what policyholders are now being charged, not by reference to what insurers think they can settle or transfer them for (generally lower). The IASB itself, however, has now overruled the industry's common sense, as embodied in that approach, in favour of exit price, which must inevitably produce the highly controversial 'Day 1' profits on inception of an insurance contract. So there is still plenty of work to be done here at both a practical and a conceptual level to explore further what are the relevant valuation ideas and what are the related relevant income (or 'performance') measurement issues.

I hope I have said enough to indicate why we still teach deprival value thinking to our students. Despite the apparent fashion for 'fair value' it is deprival value/relief value that makes one ask the right questions, even if the answers may no longer be so clear as standard setters would wish them to be.

7. Ken Peasnell: deprival value today

Professor Peasnell expressed his pleasure at the invitation to speak about deprival value at this event, as a subject that he first heard about from Will Baxter when Peasnell was a MSc student at

⁴ For example the Financial Accounting Standards Board's Statement No. 157 *Fair Value Measurements* (issue date 09/06).

LSE 36 years ago. Peasnell has written various pieces on the subject over the years, and noted that when he did so Baxter was the first person to whom he turned for views on a paper's arguments.

Bonbright (1937) is usually credited with introducing the familiar deprival value model to accountants, via the works of Wright (1964), Solomons (1966), Baxter (1967, 1971, 1975) and Parker and Harcourt (1969). Deprival value came to the attention of UK practitioners when it was made the proposed valuation basis in Sandilands (HMSO, 1975) and finally in the short-lived inflation accounting standards – SFAS 33 (FASB, 1979) in the USA and SSAP 16 (ASC, 1980) in the UK, and similar standards or proposed standards in other countries. Deprival value has lived on, in the UK at least, through standards concerned with asset revaluation. An interesting current question is how it relates to the 'fair value' concept advanced by FASB and IASB for financial instruments, an issue I touch on briefly later.

Baxter was a man who greatly prized precision of argument and expression. In that spirit, I will start with some notation. The familiar version of the model can be succinctly expressed as:

$$DV = \min[RC, RA]$$

where DV represents deprival value, RC is an asset's replacement cost and RA is the 'recoverable amount' made possible by current ownership of the asset:

$$RA = \max[PV, NRV]$$

PV represents the present 'value in use' and NRV the net realisable value.

One criticism that has been made of deprival value is that it appears to perpetuate the accountant's traditional conservative 'lower of' orientation and, as a result, to mix valuation bases (Chambers, 1970). That is an error, but it is an understandable one, given the way the conventional formula expresses deprival value as the lower of replacement cost and recoverable amount. However, no student of Baxter who listened carefully to what he had to say should have made such a mistake.

What is so impressive about Baxter's contribution is that he always argued from first principles. For him, deprival value was a process of comparing budgets or values with and without the asset:

$$DV = PV(\text{with asset}) \text{ minus } PV(\text{without asset}). \quad (1)$$

To see the connection between the two specifications, let us rewrite the familiar model, $DV = \min[RC, RA]$, by adding and subtracting $RA = \max[PV, NRV]$ from the right-hand-side and rearranging as follows:⁵

$$DV = RA + \min[RC - RA, 0] \quad (2)$$

$$= RA - \max[RA - RC, 0] \quad (3)$$

In other words, the deprival value is the amount by which the firm is better off from owning the asset: it is the higher (not lower) of two values. That is the good news. The bad news is that determining the RC of a long-lived asset might (in principle) entail forecasting far into the future – hence Baxter's long-standing interest in depreciation, and the concern of many about its inherent subjectivity.

A key issue with deprival value is the extent (and direction) of the 'spread' between entry (RC) and exit (NRV) values. To see this, group the various possibilities as in Table 1.

It has been commonplace over the years to regard deprival value as being best approximated by replacement cost. However, as Table 1 makes clear, this implies that $NRV > RC$, which might be expected to apply in goods markets where the buying (wholesale) and selling (retail) markets are segregated such that it is not easy to arbitrage between the two. To the extent that we can safely regard $NRV < RC$ as being the normal case (as it would be in markets for financial instruments, for example), we know that deprival value must lie somewhere within the bounds set by the RC-NRV spread. If this spread is very narrow, there will be little ambiguity about deprival value: it will be (roughly) equal to market price. This issue has become topical again, through the introduction of 'fair value' accounting by the standard setters. The essential idea of fair value is that it is an arm's length market price, usually taken to mean the selling (or bid) price.

More recently, van Zijl and Whittington (2006) have tried to bridge the gap between fair value and deprival value, by focusing on the situation where $NRV > RC$. This can arise in three main ways:

- Inventory held for sale, in the normal course of business.
- Property in a location with higher alternative use-value.
- Excess capacity (might have option value).

In all three cases, the deprival value algorithm suggests $DV = RC$, which could be argued to un-

⁵ Editor's note: Equation (2) is derived algebraically by substitution. Equation (3) is a rearrangement of equation (2) which allows direct comparison with Baxter's view in equation (1). To relate equation (3) to (1), consider the terms on the right hand side of equation (3). The first term RA can be equated to the cash flow obtainable with the asset, which is PV where the asset is in use. The second term $\max[RA - RC, 0]$ can be equated to the cash flow obtainable without the asset which, at worst, will be zero. Consider two possible situations. One is that the replacement cost is greater than recoverable amount. The other is that the replacement cost is lower than recoverable amount. If $RC > RA$ then $(RA - RC)$ is negative and the expression (3) reduces to $DV = RA$. If $RC < RA$ then $(RA - RC)$ is positive and expression (3) reduces to RC .

Table 1 Positive market relationships of NRV and RC			
Markets	The firm	Deprival value	Comment
NRV<RC	NRV<RC<PV	RC	NRV≤DV≤RC
	NRV<PV<RC	PV	
	PV<NRV<RC	NRV	
NRV=RC	PV<NRV=RC	NRV	All values are the same
	NRV=RC<PV	RC	
NRV>RC	RC<NRV<PV	RC	PV irrelevant
	RC<PV<NRV		
	PV<RC<NRV		

Table 2 Modified deprival value			
Markets	The firm	Usual DV	Modified DV
NRV<RC	NRV<RC<PV	RC	RC
	NRV<PV<RC	PV	PV
	PV<NRV<RC	NRV	NRV
NRV>RC	RC<NRV<PV	RC	NRV
	RC<PV<NRV	RC	NRV
	PV<RC<NRV	RC	NRV

Table 3 Including the option to wait		
The firm	Usual DV	Option adjusted DV
NRV<RC<(PV-OW)	RC	RC
NRV<(PV-OW)<RC	PV	PV-OW
(PV-OW)<NRV<RC	NRV	NRV
RC<NRV<(PV-OW)	RC	RC
RC<(PV-OW)<NRV	RC	RC
(PV-OW)<RC<NRV	RC	RC

derstate value to the firm because it ignores these additional sources of value.

In their discussion of the deprival value formulae, van Zijl and Whittington (2006) propose modifying the formulae by adding the sale profit = NRV-RC (which can be thought of as the ‘intrinsic value’ of the ‘option to sell’) to conventionally-de-

termined deprival value if, and only if, this sale profit is positive (see Table 2).

Firm-specific factors still arise when NRV<RC, but are limited to the ‘spread’: NRV < DV < RC. But now we have four situations where (modified) deprival value is equal to NRV; as such, the gap between it and the fair value concept favoured by

the standard setters is greatly reduced. Fair value will still tend to overstate deprival value, but less often so.

It should not be overlooked that the option to sell incorporated by van Zijl and Whittington into deprival value is measured at intrinsic value, not economic value. This will lead to an understatement of deprival value, should the option have long to run and the uncertainty of the benefits be high.

There are other embedded options that come to mind. For example, Stark (1997) raises the issue of what to do with the 'option to wait' when considering replacement. Suppose we represent the economic value of this option as OW. Stark shows that the deprival value formula needs to be restated as shown in Table 3.

The two options can be readily combined.

The application of deprival value (fair value too) involves the introduction of subjectivity in all markets when entry and exit prices differ. This runs down the fault line of academic opinion:

- Subjectivity allows management to communicate additional information.
- Subjectivity introduces the spectre of earnings management and reduces the usefulness of accounting numbers as measures for contracting purposes.

How all this will play out remains to be seen. Baxter wrote about valuation and income measurement during inflationary times, and his contributions must be viewed in that light. Inflation has been largely tamed – for the time being. But it is a brave person who will predict that it has been tamed forever. Global warming is going to change the world's landscape in more ways than one; past experience suggests that the resultant turmoil will bring inflation in its wake, and for that we need appropriate tools. Baxter's works lie waiting for such a time.

8. Professor Richard Macve: Conclusions

What have we learned today? The foundations laid by Will Baxter at the London School of Economics (together with David Solomons and Harold Edey) still underpin the core of understanding about accounting that inspires much academic teaching and research, and increasingly practice. And even though many of Baxter's students have themselves become leading 'establishment' figures in accounting and finance, including as regulators and standard setters, Baxter's admonition (following Bacon) that 'truth is the daughter not of authority but of time' reminds them to be circumspect in claiming too much 'authority' for their pronouncements and that they continually need to rise to

Shyam Sunder's appropriately American counter-challenge to 'let freedom ring'.

We have seen how 'deprival value' (and its complement 'relief value' for liabilities) is still central to the teaching of Financial Accounting and Reporting on the BSc and MSc at LSE – because we think it makes one ask the right questions about value, income and decision making.

I remember Baxter observing that the more one studies accounting the more one realises that it is not the actual numbers produced that are so important as the discipline of the process by which they are arrived at. Here perhaps is a cryptic beginning of what was later to be developed at the LSE, studying how the process of accounting as a 'calculative routine' both shapes and is shaped by organisational, institutional and other social factors. Above all, as so many of the tributes in the book of reminiscences⁶ testify, Baxter taught us that our job in attempting to understand the truth is to do our utmost to explain complex issues and ideas in as simple a way as possible, and to eschew the pretensions of those who seek to obfuscate and turn what is simple into something unapproachably complex.

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⁶ A Book of Reminiscences was presented to Mrs Leena Baxter at the Symposium.

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Book Review

Ethics and the Professional Accounting Firm: a Literature Review. Aileen Pierce. The Institute of Chartered Accountants of Scotland, 2006. xiii+185pp. EAN 9781904574246

This literature review was written and prepared by Dr Aileen Pierce of University College Dublin. It represents the third in a series of works commissioned by the Institute of Chartered Accountants of Scotland under the general rubric of *Taking Ethics to Heart*. This new volume is particularly welcome because the activities of professional accounting firms continue to be questioned and scrutinised by a variety of different parties including governmental regulators as well as the general public. Regulatory and professional bodies in more than one country have sought to reassure the public about the integrity of auditors and auditing firms, particularly with respect to restoring and maintaining confidence in the reliability of information provided to the capital markets.

This book identifies a number of issues dealing with the ethical practices of professional accounting firms. In the first chapter of the book, there is a discussion of the literature pertaining to professions and professionalism in general, and specifically with regard to professional accountancy. The literature suggests that a growing commercial orientation and entrepreneurial attitude within professional accounting firms appears to be exerting pressures on traditional professional values, thereby questioning the profession's commitment to such values.

Chapter two reviews the literature on professional ethics and the role of ethical codes in professional accountancy. This literature emphasises the potential consequences of accounting firms losing public trust and discusses the challenges faced by accounting practitioners when responding to commercial opportunities.

Chapter three discusses the ethical dilemmas and challenges experienced by accounting firms; with particular emphasis on those aspects of accounting firm activities that have been criticised in the wake of the financial and accounting scandals of recent years. The chapter concludes that more effort is needed to restore public confidence in the accounting profession and accounting firms.

In the final chapter, the book summarises the overall findings of the literature review. The literature suggests that the tensions created by profes-

sional accounting firms' pursuit of growth and profit have undermined traditional professional values. The author concludes that the organised accounting profession needs to label certain practices of accounting firms as unethical and to impose penalties that will act as deterrents to unethical practices. The author argues that the hallmark of a profession rests in the capacity of its members to exercise good judgment and that integrity must take precedence over rules in order to ensure that ethical judgments prevail. In addition the author identifies the need for further research to help inform and develop accounting firm and professional body strategies. This will require access to accounting firm personnel at all levels and to firms' policies and procedures. Questions that need to be addressed include: how does an accounting firm's culture develop?; what determines a 'good' or 'bad' accounting firm culture?; is zero-tolerance for unethical behavior in accounting firms reasonable?; and can the focus on commercial success by professional firms be reconciled with high moral standards?

My overall assessment of this work is that it is an important and useful addition to the literature on accounting ethics. The work can be used both by practicing accountants and by accounting educators to enhance their knowledge of the ethical practices and behaviours of professional accounting firms. It is a very well done effort, and both the author and the ICAS are to be congratulated.

That being said, the remaining observations which I may be able to offer about this work are somewhat more critical, not because the author's efforts have not been diligently and competently done, but due to certain assumptions which appear to underlie the work, namely that professionals and professional firms are different from other occupations in society. This is a contested concept which needs to be unpacked and discussed. Although it is reasonably clear that in both Scotland and England, and perhaps in certain other countries which share the British heritage, the public accounting profession was initially based on a shared set of professional values, it must now be recognised that these professional values were largely a product of a particular time and place; namely, Victorian Britain in the 19th century, when the notion of a 'gentleman professional' was a concrete ideal to be aspired to. This ideal no longer exists and probably has not existed for at

least half a century. Thus the question which the author raises at the very end of the book, as to whether there is a difference between a profession and an industry in the 21st century, is probably meaningless for several reasons.

First, it is not at all clear that society as a whole has ever entered into an agreement with certain occupational groups pursuant to which the occupational group agreed to maintain certain ethical standards in exchange for a monopoly of practice in certain areas. In the UK, this apparent social agreement was largely the result of political manoeuvring on the part of organised groups in order to obtain royal prerogatives. There was little democratic involvement in the granting of these privileges, and certainly the public as a whole was not consulted. In the US, the certified public accounting profession similarly achieved a monopoly of practice in company audits largely as a result of political manoeuvring.

Second, there is only one professional activity, at least in the US, pursuant to which professional accounting firms have a monopoly of practice, namely company auditing. In all other areas of accounting practice, professional accounting firms are simply engaged in an industry like any other, and this has been true for years. Thus, the commercial attitudes of accounting firms are neither surprising nor unexpected.

Third, it is questionable that there is such a thing as the 'public interest' which professional account-

ants have agreed to serve. What is the public interest function of professional accountancy? Some would argue that it is to provide reliable financial information for decision making in capital markets; surely an important function. What must be recognised, however, is that the overwhelming importance of public accounting for well functioning capital markets relegates activities that do not serve the needs of the capital markets to secondary importance. Merely asserting that there is such a thing as a general 'public interest' function for public accounting does not make it so.

Fourth, in the current state of global civilisation where there are growing levels of ethnic, racial and religious diversity, to suggest that there may be ways of institutionalising 'moral character' has relatively little meaning. Whose moral character are we speaking of? Because there is no agreed upon definition of 'moral character', seeking to institutionalise such a concept would appear to be a difficult task.

A more pragmatic course would be to define clearly what functions a professional accounting firm would be expected to perform, as well as the parameters of performing these functions, and then to hold the firm legally responsible (not ethically or morally responsible) for fulfilling these functions in a competent and thorough manner.

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Accounting Standards Steering Committee (1975). *The Corporate Report*. London: ASC.

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Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelt with an 's', not a 'z'. Single quotation marks should be used, not double.

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Accounting manipulations and political costs: Tooth & Co Ltd, 1910–1965

Mark Wilson & Greg Shailer*

Abstract—Positive accounting theory posits that political costs influence accounting choices by large firms. Most studies rely on cross-sectional analyses of large samples using coarse data. We employ rich archival data to analyse the profit measurement and disclosure practices of Tooth & Co, a large Australian brewing company, from 1910 to 1965. This period provides considerable variation in scope and incentives to manipulate reported profit. Reporting discretion changed significantly from early voluntary disclosure through to the extensive scheduled disclosure requirements of the *Companies Act 1961*. Varying incentives include changes in excise duties levied on beer production, and dramatic company growth and market dominance resulting from takeovers of competitors and vertical integration. We examine the pattern of reported profit in relation to internal records and the pattern of accruals. We find that Tooth's profit-smoothing practices and understatements were perceived by management as important in justifying dividend policy, while systematic understatements of reported profit were used to avoid potential political costs associated with high profitability and market dominance. The most significant relative increases in profit understatement are shown to occur where dividend policy and political cost motivations coincide.

Key words: Earnings management; income smoothing; accounting history; political costs; brewing industry

1. Introduction

We investigate the varying relative importance of commonly asserted motivations for earnings management, as revealed in the reporting behaviour of Tooth & Co (a large Australian brewing company), over the period 1910–1965.¹ Using both quantitative and qualitative archival sources, we explicate the interdependent effects of motivations attributable to dividend policy and political costs. Our examination also highlights the effect of major legislative changes, especially the *Companies Act (New South Wales) 1961*, which restricted the scope for opaque earnings management. Our paper differs from the prior literature in the nature of the evidence presented to support our explanation of historical earnings management. We present primary source evidence of the motivations for, and extent of earnings management in, the form of private managerial memoranda and profit estimates.

We identify and examine two forms of earnings management that were persistently applied and assumed significant magnitude at Tooth & Co:

- profit-smoothing behaviour – the manipulation of accounting measures to reduce the variability in reported profits.²
- profit-reducing behaviour – the manipulation of accounting measures to understate reported profit.

Because of the reversing nature of accruals, understatements necessarily occur in some periods as a consequence of true smoothing behaviour, but neither understatement nor smoothing is a necessary condition for the other. The relationship between the two phenomena is weaker in this study because, while all accruals eventually reverse, reversals can be delayed for long periods (decades in the case of Tooth & Co) and, under early disclosure regimes, reversals were easily managed to conceal their origins.

The next section provides a brief history of Tooth & Co. In Section 3, we describe our evidence sources and discuss methods and extent of Tooth's earnings manipulation. In Section 4 we discuss the relevance of the motivations for earnings management suggested by the early and recent literature, and the extent to which these appear relevant to the reporting behaviour of Tooth. In

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¹ Tooth & Co Ltd brewing interests were sold in 1983 but the corporation has continued as a listed investment company. Any inferences a reader may draw regarding Tooth & Co Ltd should not reflect on the post-1983 entity in any way.

² This is distinguished from other smoothing devices, such as adjusting the timing or magnitude of actual transactions.

Section 5, we examine in detail periods of particularly unusual reporting behaviour in the context of the motivations identified in Section 4.

2. Tooth & Co – a brief history

The brewing firm that became Tooth & Co was formed in Sydney in 1835, initially as a partnership between John Tooth and Charles Newnham. The company incorporated in 1859 and its shares were offered for public subscription in 1888, by which time it had secured approximately 31% of the New South Wales (NSW) beer market.³ A severe economic depression struck the Australian colonies in the early 1890s, which Tooth survived (unlike several competitors) and turned to their advantage by acquiring the freehold titles of many licensed establishments at bargain prices. While the market was superficially competitive in the early 20th century, testimony to a 1901 parliamentary inquiry into the 'tied-house system' asserted that Tooth had sufficient market power to shut down every competitor in Sydney if it so chose.⁴ Central to this market power was the 'tied-house system', whereby brewers secured the trade of licensed pubs in a system where the number of licenses was capped by regulation.⁵

Initially, 'tying' was effected predominantly by means of loan covenants, and brewers used contractual restrictions or other pressure to prevent publicans from extinguishing the tie by clearing the debt. Stubbs (1999: 94) estimates that, by 1901, 90% of the Sydney market was 'tied' by the major brewers, with Tooth representing the majority of these interests. Brewers spent considerable resources trying to gain control of hotels tied to competitors but the 'loan-tie system' was expensive to administer and the 'clogging' of trade ties was eventually struck down by the House of Lords in 1902.⁶ Ultimately, the larger brewers secured retail trade by acquiring the freehold titles and either appointing a licensee-manager or sub-letting the hotel under an exclusive supply agreement.

By 1911, when Tooth and a significant competitor (Toohey's) jointly purchased and liquidated the large Marshall's Brewery, the company's market share had reached 55%. In 1918, the five surviving major brewers in NSW signed an agreement to fix prices and refrain from interfering with each others' tied houses.⁷ By 1929, when Tooth took over the large but financially crippled Resch's Ltd, Tooth had assumed control of all but one of the signatories to the 1918 agreement. Thus, in 1929, Tooth controlled 80% of the NSW market and had a single significant competitor, Toohey's, with whom Tooth dominated the United Licensed Victuallers Association (ULVA), which dictated minimum retail prices.

Overlapping this period, the temperance movement had some influence on political actions in

Australia, culminating in the *Liquor Act 1905* that introduced a 'local option' to prohibit alcohol sales and increased the powers of the newly formed License Reduction Board (LRB). The LRB had the power to de-license premises for various reasons, and the number of licensed premises in NSW fell from 3,063 in 1905 to 2,059 in 1925, increasing the value of surviving licensed premises. Subsequently, the Great Depression temporarily stunted Tooth's growth but, after the initial demand shock, Tooth embarked upon a massive expansion in their retail interests, increasing their freehold titles from 420 to 553 between 1932 and 1936. The then NSW market was only 2,037 hotels. Allowing for long-term leasehold properties and tied houses, we estimate that Tooth directly controlled approximately 50% of the hotels in the state by the end of the decade.

The Second World War (WWII) inhibited operations in traditional retail markets due to the rationing of beer, moratoria on capital works and huge excise increases but, as will be shown later, these effects were well cushioned by the extra demand created by the allied armed services and increased profitability of company-operated hotels. The NSW Parliament passed the *Monopolies Act* in 1941, prohibiting price-fixing and strengthening provisions against anti-competitive behaviour. Legal advice indicated that the price-fixing restriction were of no direct consequence to Tooth because the ULVA, over which Tooth exerted significant influence, officially determined minimum prices.⁸ Government regulation of retail prices, which began in 1942 and continued in some form until 1955, was also of little consequence to Tooth's profits. Production costs, excluding excise, were falling during this period and the combination of price controls and rationing ensured an active black market in bottled beer, the profits from which trickled down into rents on public houses. Rationing and capital works restrictions continued beyond WWII and the resulting pent-up demand, once released, saw record levels of inflation in the early 1950s. This reduced the present value of long-term sub-leases on hotels.

Two significant regulatory changes in the late 1940s and early 1950s were licensing changes that allowed an explosion in the number of 'clubs' sell-

³ Market share has been estimated by dividing Tooth's galonage by Estimated NSW Consumption (Noel Butlin Archives Centre, Australian National University (hereafter NBAC). Tooth & Co Archive, Z223/86, Sales).

⁴ NSW, Select Committee on Tied Houses, 'Report' 1901.

⁵ See Knox (1958) for a discussion of this phenomenon in the UK brewing industry.

⁶ Noakes & Co Limited vs Rice [1902] AC 24.

⁷ NBAC. Tooth and Co Archive, N20/1279, Liquor Trades Defence Union File.

⁸ NBAC. Tooth & Co Archive, N20/2875, Monopolies Act File.

ing alcohol and the end of compulsory 6 p.m. closing in 1955. The number of licensed clubs in NSW increased from 87 in 1947 to almost 1,000 in 1960, posing substantial competition to Tooth's hotel market.⁹ Although the major brewers secured the trade of some clubs by installing beer drawing equipment at discounted rates, in 1956 Tooth experienced their largest single-year fall in market share. Coinciding with a major excise rise in the same year, they reported a substantial drop in profits. However, by the end of our sample period in 1965, the company's performance had improved to record levels in both real and nominal terms, although Tooth's market share remained below 72%.

Our study ends in 1965, after which Tooth experienced turbulent changes and eventual demise as a brewer. In the years following 1965, Tooth faced a substantial competitive disadvantage against Toohey's caused by the size of Tooth's inner-city brewery relative to its competitor's much larger, modern, suburban site.

During the 1970s, many freehold hotels were sold in a market that Tooth had effectively flooded. The *Trade Practices Act 1974* outlawed the exclusive trade deals, even for brewery-owned premises. When the final appeal against this decision was lost in 1979, Tooth became the focus of takeover speculation and, in 1983, were taken over by Adsteam Ltd and their brewing assets sold to Elders-IXL Ltd (now Fosters Brewing Group).

3. Tooth's manipulations of reported profits

Throughout its existence as a listed brewing company (1888–1983), Tooth maintained *internal profit* records for use by management. We compare the internal profit measures derived from these records to the *reported profit* measures contained in the published annual reports.

The format of the internal records varied over time, but the internal profit measures were consistent across our sample period (1910–1965). We omit the years prior to 1910 because of the unavailability of tax return data,¹⁰ which we use to estimate internal profit for the years 1910–1924 and to corroborate the measures of internal profit for the years 1925–1965. The internal records do not specify a unique profit for the years 1910–1924; therefore, we rely on taxable income, as disclosed in the state tax returns, as the measure for 'internal' income.¹¹ Federal taxation law allowed state taxation paid as a deduction and so federally reported taxable income understates internal income. Dividends paid were an allowable deduction under state law until 1920, and are added back to determine internal income. Because reported profit is net of tax, we adjust the pre-tax internal profit by actual or estimated tax paid. For the years 1925–1965, we take our measures of internal profit from detailed six-monthly income

statements that the company produced for internal use.¹² Internal data covering 18 months during 1955–1956 are unavailable, during which period Tooth changed their financial year-end from September to March. These years are excised from our later time series analysis. The series of annual published profits and internal profits are listed in Table 1.

We begin our analysis by considering the methods used to manipulate earnings and extent of earnings management across the sample period. In Section 4 we conduct more detailed analysis of the temporal variations in the level of earnings management.

Tooth's reported profits were managed primarily through the use of 'secret reserves'. From its early years as a public company, 'provisions' (contra-assets) made against the value of fixed assets, receivables and inventory exceeded the amount necessary to report those items in an unbiased fashion. Prior to 1963, only the net carry values of these items were disclosed in the published financial statements. From 1963, the new *Companies Act 1961* required the disclosure of the gross value of the assets, their provisions and the balance of the 'provision for tax' (tax payable).¹³ As summarised in Table 2, in any given year for our study period, increases in Tooth's 'secret reserves' decreased reported profit.

Tooth had up to 25 separate 'secret reserve' accounts recorded in its sundry creditors ledger. Balance day entries to reduce reported profit deployed the 'secret reserves' to reduce reported fixed assets, receivables or inventory. To make the balance-sheet composition appear reasonable, the off-sets were made against different asset accounts in different years, with no particular relationship between the offset accounts; for example, in one instance, a provision for depreciation account was offset against reported net receivables. An exception to the practice of off-setting secret reserves against assets was the treatment of the 'provision for taxation'. This balance was buried in, and represented at least 70% of, 'sundry creditors' until its

⁹ Off-license sales of alcohol were restricted to on-licensed premises and a relatively small number of wine merchants.

¹⁰ NBAC. Tooth & Co Archive, Z352/37–42, Tax Returns.

¹¹ A reconciliation of tax return data and individual line items within Tooth's internal profit and loss ledger across the entire study period suggests that taxable income is a reasonable proxy for internal income across these years.

¹² NBAC. Tooth & Co Archive, N20/360–365, Departmental & Combined Trading and P/L Accounts.

¹³ The use of 'secret reserves' is distinguished from the current situation when an entity excessively depreciates fixed assets because, in the contemporary environment, depreciation expense, gross asset values and accumulated depreciation must be disclosed. Similarly, contemporary manipulations of bad debts expense is constrained by disclosure requirements for the gross and net receivables, exposing the allowance for doubtful debts to a credibility check.

Table 1
Published and internal profit

<i>Year</i>	<i>Published profit £</i>	<i>Internal profit £</i>	<i>Year</i>	<i>Published profit £</i>	<i>Internal profit £</i>
1910	159,711	185,415	1938	841,839	1,876,379
1911	217,565	246,930	1939	855,709	1,848,770
1912	229,706	288,039	1940	870,299	1,872,290
1913	246,544	292,731	1941	809,036	1,959,608
1914	288,963	308,170	1942	763,439	2,055,822
1915	284,795	290,201	1943	789,041	2,160,348
1916	201,923	260,131	1944	839,623	2,232,758
1917	172,654	189,747	1945	858,022	2,338,101
1918	162,575	336,678	1946	862,956	2,392,114
1919	157,008	295,836	1947	884,516	2,530,343
1920	171,190	330,402	1948	916,292	2,108,289
1921	225,949	445,713	1949	943,159	2,143,611
1922	235,175	469,721	1950	958,808	2,406,949
1923	293,373	667,578	1951	949,246	2,149,276
1924	311,706	701,236	1952	952,776	2,024,133
1925	367,650	718,000	1953	1,013,740	2,364,005
1926	440,228	769,995	1954	1,075,075	2,599,483
1927	509,085	808,318	1955	1,180,909	N/A
1928	590,133	879,522	1956	619,361	N/A
1929	634,054	1,019,464	1957	1,238,963	2,312,274
1930	686,391	1,057,771	1958	1,278,412	2,652,770
1931	480,830	833,349	1959	1,322,170	2,455,374
1932	467,473	782,087	1960	1,368,171	2,828,139
1933	482,204	831,061	1961	1,470,422	2,807,779
1934	567,119	1,173,345	1962	1,504,830	2,571,429
1935	628,699	1,304,050	1963	1,911,231	2,831,660
1936	696,027	1,348,741	1964	2,189,437	2,890,702
1937	774,695	1,594,299	1965	2,252,895	2,907,695

legislated disclosure in 1963. The undisclosed 'provision for taxation' account approximated actual tax payable until 1934. Thereafter, tax expense is significantly overstated until the early 1950s, peaking at an overstatement of £472,000 (76%) in 1942.

The extent to which understatements of reported profits used the secret reserves is illustrated in Table 2. Aggregate increases in secret reserves for 1910–1962 (£27.5m after adjusting for asset revaluations) account for 74% of the accumulated understatements in reported profits for the period. The remaining understatements are attributed to balance day adjustments made directly to asset 'cost' accounts. The secret reserves do not reflect plausible provisions against assets values.¹⁴ Reported profits were always less than internal profit but the extent to which the secret reserves were defensible as smoothing provisions for future losses, at the time they were created, remains moot. This is portrayed graphically in Figure 1, where the understated reported profit series also

appears much smoother than the internal profit series.¹⁵ A detailed analysis of the smoothing and understatements is presented in Sections 4 and 5.

Although the understatement of reported profits persisted throughout the study period, the balances of the secret reserves did not grow unabated. This is illustrated in Figure 2, which graphs the annual balances of the secret reserves. This reveals substantial reductions in the secret reserves in 1927, 1948, 1954, 1958 and 1963. The reduction in the secret reserves in 1927 was capitalised via a bonus issue and a compensating write-up of asset values. The 1948 reduction reflected a decision to disclose, as an increase in accumulated surplus, almost £2m

¹⁴ Amounts provided against receivables, for example, frequently exceeded 35% of the balance owing and in most years were more than 10 times the bad debts actually written-off.

¹⁵ The reduced measure and volatility of reported profits is also evidenced by the first two moments of the distributions: The standard deviation of reported profit is £494,733 against a mean £753,639, while the standard deviation of internal profit is £1,117,221 against a mean £1,471,066.

Table 2
Changes in secret reserve and profit understatements

<i>Year</i>	<i>Change in secret reserves £</i>	<i>Profit understatement £</i>	<i>Year</i>	<i>Changes in secret reserves £</i>	<i>Profit understatement £</i>
1911	62,138	29,365	1938	1,006,382	1,034,540
1912	66,652	58,333	1939	930,162	993,061
1913	-209,695	46,187	1940	778,835	1,001,991
1914	89,728	19,207	1941	953,362	1,150,572
1915	37,773	5,406	1942	517,449	1,292,383
1916	21,583	58,208	1943	639,241	1,371,307
1917	37,574	17,093	1944	684,755	1,393,135
1918	168,009	174,103	1945	1,079,282	1,480,079
1919	103,574	138,828	1946	1,074,773	1,529,158
1920	169,973	159,212	1947	1,278,154	1,645,827
1921	491,183	219,765	1948*	-2,300,492	1,191,997
1922	233,998	234,547	1949	720,487	1,200,452
1923	223,881	374,205	1950	948,680	1,448,141
1924	442,045	389,530	1951	697,277	1,200,030
1925	340,339	350,350	1952	262,736	1,071,357
1926	230,994	329,767	1953	985,950	1,350,265
1927*	-532,619	299,233	1954*	-2,602,173	1,524,408
1928	357,974	289,389	1955	1,248,504	N/A
1929	583,882	385,410	1956	471,971	N/A
1930	331,699	371,380	1957	1,447,117	1,073,311
1931	-9,031	352,519	1958*	-3,452,102	1,374,358
1932	28,446	314,614	1959	1,607,292	1,133,204
1933	71,134	348,857	1960	1,347,291	1,459,968
1934	372,569	606,226	1961	1,718,038	1,337,357
1935	612,101	675,351	1962	908,526	1,066,599
1936	635,114	652,714	1963*	-14,778,410	920,429
1937	701,177	819,604	1964	124,853	701,265
			1965	-843,673	654,800

*Years in which reserves were closed to 'companion' accounts or disclosed as part of accumulated surplus

of 'previously un-disclosed reserves no longer deemed necessary'. Reductions in 1954 and 1958 were associated with reported asset revaluations, in which provisions (contra-asset accounts) were closed off to their companion accounts (fixed asset and receivable accounts) prior to asset revaluations through the reported asset revaluation reserve. The largest adjustment occurred in 1963, when the *Companies Act 1961* required balance sheet disclosure of all 'provisions' against the value of fixed assets and receivables. The secret reserve accounts and their 'companion' asset accounts were written down by £13m, and the balance in the previously secret reserves (approximately £4m) appeared on the balance sheet as the required contra-asset accounts, along with the provision for taxation.

¹⁶ We do not examine the considerable literature covering incentives to overstate earnings, as this phenomenon was not observed at Tooth & Co during our study period.

¹⁷ The invaluable review of the US smoothing literature in Buckmaster (2001) directed our attention to many of these early references.

4. Motives for Tooth's profit manipulations

The existence of persistent and significant understatements of reported profits may be explained by both long-term and short-term motivations.¹⁶ The study period commences several decades prior to the development of the accounting literature that addresses political costs and smoothing. Therefore, to contextualise Tooth's behaviour, we consider both the relevant literature of the early 20th century and the main implications of the post-1950 earnings management literature.¹⁷

The accounting literature of the early 20th century discussed accounting manipulations for the purpose of smoothing or reducing profit (e.g. Dicksee, 1903; Littleton et al., 1929). Some accountants actively championed the use of secret reserves for smoothing purposes; for example, Walton (1909) as cited by Buckmaster (2001). Smoothing was portrayed as a means of achieving a lower cost of capital and to promote stable dividend payments, implying a market aversion to volatility in annual profits, irrespective of long-

Figure 1
Internal profit v published profit 1910–1965

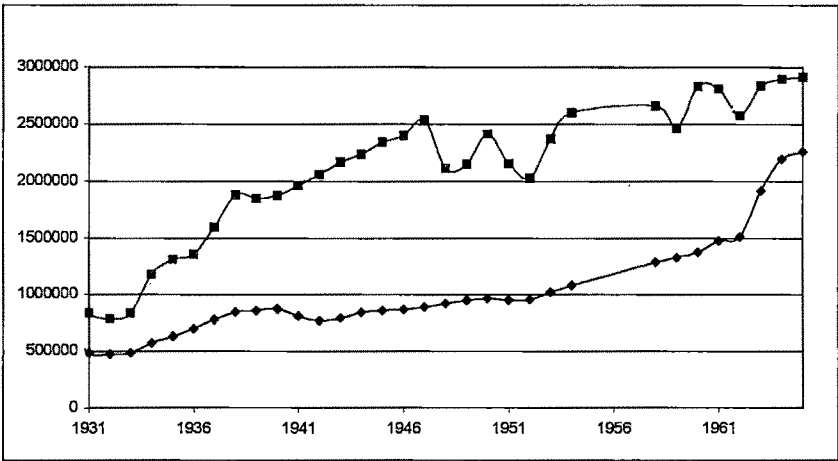
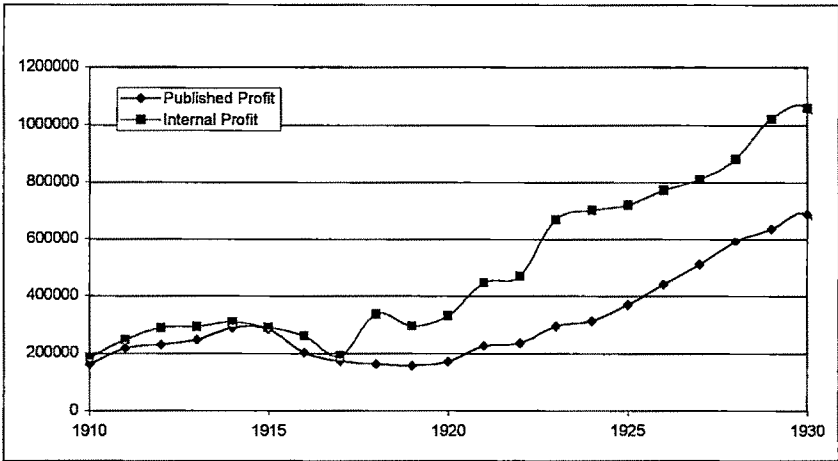
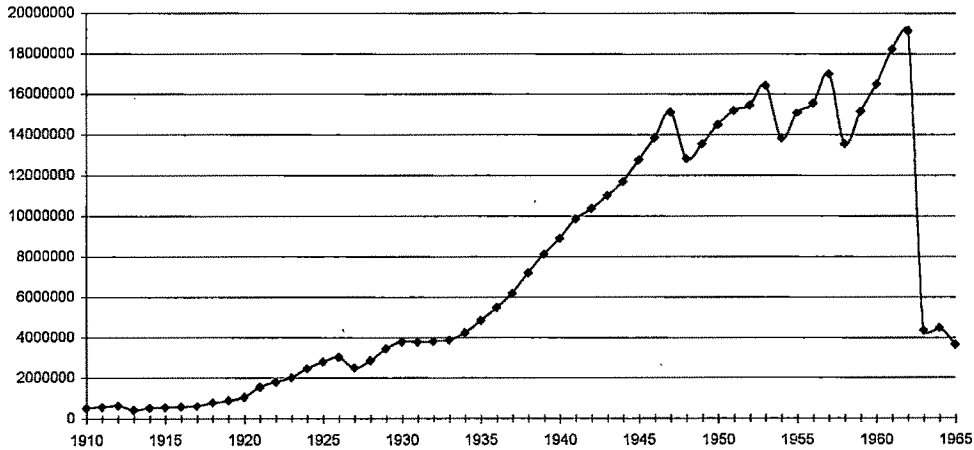


Figure 2
Total secret reserves and tax over-provisions



term performance. The contemporaneous relationship between reported annual profit and investors' expectations of the dividend was a driving factor behind the creation of 'secret reserves' and subsequent smoothing (Dicksee, 1903). Where a firm's underlying profit exceeded the 'prudent' level of dividends, management were encouraged to understate reported earnings by creating undisclosed reserves, which could be reversed subsequently when the periodic profit was less than the desired dividend payment. The rationale for such a close relationship between current period earnings and 'expected' dividends was not legislative, given that dividends could also be legally appropriated from accumulated surplus, but may include the relative financial literacy of investors (Paton, 1932).

While early theorists accepted that secret reserves were often accumulated well in excess of plausible smoothing requirements, they did not identify reasons, additional to the dividend policy motivation, for long-run profit understatement. Dicksee's essay is representative of those opposed to the use of secret reserves:

'Occasionally Reserves are provided far in excess of any loss that may be reasonably expected, even by the most pessimistic. Such Reserves are, of course, indefensible theoretically, for from this point of view it is as improper to understate as it is ... to overstate.' (Dicksee, 1903: 49)

Criticism of smoothing is again reflected in Paton (1932). Paton tackled issues such as the direct crediting of gains to surplus (retained earnings) and arbitrary depreciation adjustments in a rejection of smoothing as sound business behaviour:

'This whole proposition of developing stable statistics for business enterprise characterised in reality by marked instability is one of the most unwholesome attitudes ... After all is there anything involved here but more or less sophisticated misrepresentation?' (Paton, 1932: 262).

The consequences of using undisclosed reserves to *enhance* reported profits were highlighted in the spectacular collapse of the Royal Mail Group in 1930–1931, which may represent a turning point in popular perceptions of the acceptability of the use of secret reserves.¹⁸ In his commentary on the Royal Mail case, Hastings (1962) quotes evidence presented in the case that the use of secret reserves was generally acceptable through the 1920s. Davies and Bourne (1972) attribute some degree of causation between the Royal Mail Group collapse and several provisions of the UK *Companies Act* of 1948, in particular the prohibition of the formation and use of secret reserves.

Recent rationales of earnings management are

more circumspect. While stable dividends policies may still be sought, the current nexus between disclosed annual profit and dividends is tenuous. Following the focus on equity investor satisfaction, which continued to emphasise earnings stability (e.g. Hepworth, 1953), and concurrent with developments in finance theory, the literature matured to admit earnings management motivations relating directly to other stakeholders in the firm. The plausible motivations for earnings management include: managerial self-interest; earnings quality considerations; equity market preferences, which include the earlier focus on dividend policy; debt market preferences; and political cost considerations. In the following sections, each of these incentives to manage reported earnings is developed in relation to the Tooth & Co case.

4.1. Earnings manipulations and managerial self-interest

Theories of earnings management based on managerial self-interest generally fall into one of two categories: agency theory adaptations and bonus plan incentives. An example of an agency theory adaptation is the suggestion that secret reserves, rather than pertaining to the control of a firm's dividend policy, provide opportunities to enhance the manager's utility. The existence of managerial bonus plans affected by reported earnings precipitate well-known incentives for earnings management (see Healy, 1985). Relevant to both categories, it has been argued that incoming CEOs manage earnings downwards in the initial year of their incumbency and upwards in subsequent years (see Wells, 2002; Godfrey et al., 2003). Neither category seems relevant to Tooth. There were only two CEO changes during 1910–1965, each of which was planned and resulted in the deputy CEO assuming control, and Tooth's management were not paid formal bonuses.

It is also argued that a manager's utility is enhanced by obtaining control over free cash flows (Jensen, 1986). For this to be effective, the levels of free cash flows should not be externally observable. In the case of Tooth, the balance sheets clearly reveal cash equivalents levels and changes. From 1930 to 1955, Tooth's cash equivalents bal-

¹⁸ For more than a decade, the Royal Mail Group had been trading at marginal profits or substantial losses, but reported income was boosted via transfers from excessive provisions for taxation held over from World War I. Lord Kylsant, the company's chairman was subsequently convicted of knowingly issuing a false prospectus (for a debenture issue) that contained representations in regard to annual profits. Kylsant was acquitted of issuing misleading accounts because the phrase 'Including adjustment of taxation reserves' was disclosed in relation to the calculation of profits, although there was no disclosure of the magnitude of such adjustments.

ances were substantially larger than reported profits.¹⁹ This would indicate to investors that management had control over large levels of discretionary resources, suggesting that concealment of this was not an objective in manipulating reported earnings.

4.2. Earnings management and the predictability of future earnings

An alternative perspective on the motivation for the smoothing of earnings is that the 'smoothed' published earnings figure better represents management's perception of the long-run earning capacity of the firm, and thus the fair value of the firm. This implies that a neutral application of accounting standards results in an earnings level that is an inferior predictor of future earnings than the 'smoothed' or otherwise managed earnings. Recent evidence demonstrates that earnings that have been adjusted to remove transient components possess greater information content than GAAP earnings (Bradshaw and Sloan, 2002; Burgstahler et al., 2002). However, the available records of Tooth & Co do not provide any evidence that Tooth's earnings management was intended to improve the reliability of reported earnings as predictors of future earnings.

4.3. Earnings management as a function of equity market preference

A frequently cited motivation for earnings management is equity investor preferences for stable earnings and dividends (e.g. Michelson et al., 2000). While there is considerable variation in the posited manifestation of such shareholder preferences, two central conjectures are common in the literature: (1) risk-averse investors associate greater volatility in reported earnings with greater risk, which is reflected in an increased cost of capital;²⁰ and (2) there are investors with preferences for stable cash dividends. We consider the latter with the emphasis in earlier literature on the contemporaneous relationship between annual profits and dividends in our discussion of this dividend focus.

¹⁹ This assumes that cash equivalent balances and changes are a reliable indicator of potential free cash flows.

²⁰ A firm's cost of equity capital is equivalent to investor's required return on equity, which in turn is a function of expected future dividends and capital growth. Changes in required return impact upon stock price.

²¹ Gordon *does* explicitly identify the usefulness of current reported earnings in predicting future earnings as being advantageous to shareholders.

²² Systematic risk reflects the sensitivity of a firm's stock return to market-wide returns, and as such cannot be costlessly diversified away.

²³ This presumes investors are systematically misled by the smoothed reported income stream and that there exists a differential level of smoothing across firms (Ronen and Sadan, 1981).

Equity investor risk aversion

Investor disutility from perceived investment risk is an accepted axiom of financial economics that includes arguments that volatility in reported earnings affects perceived investment risk. Hepworth (1953) is typical of the early literature in regard to earnings management, in that the relationship between earnings volatility and perceived investment risk was implied rather than explicitly stated:

'Certainly the owners and creditors of an enterprise will feel more confident toward a corporate management which is able to report stable earnings than if considerable fluctuation in earnings exists.' (Hepworth, 1953: 33)

Gordon (1964) develops an axiomatic theory of income smoothing in which management rely on continued shareholder satisfaction that, in turn, is a function of 'the stability of its income' (1964: 262); but does not explicitly identify risk-aversion as the motivation.²¹

The later literature emphasises a connection between profit smoothing and systematic risk, which is priced by the market (Sharpe, 1964).²² Beidleman (1973) refines the earlier arguments, positing that, by smoothing earnings, the perceived systematic risk of the firm's equity could be reduced, thus reducing the cost of capital.²³ The conjectured association between smooth profit streams and cost of capital does not require dividends to be stabilised. Lev and Kunitzky (1974) report a significant correlation between accounting earnings volatility and systematic risk, and Michelson et al. (2000) report that 'smoothing firms' enjoy significantly greater stock returns than others (for US S&P 500). The 'perceived risk' motivation is also supported by evidence regarding the effects of earnings volatility on expected non-diversifiable bankruptcy costs (e.g. Titman and Trueman, 1986). Concern for the cost of capital will be greater when capital raising is planned. Teoh et al. (1998) find evidence of upward earnings management prior to seasoned public equity offerings, consistent with a motivation to maximise the proceeds from issues.

Tooth made seasoned equity issues in 1936 and 1962. However, both were rights issues priced at less than 30% of the diluted minimum market value of the shares in the five years prior to each issue. It seems highly unlikely that Tooth perceived any need to smooth reported profits to maximise the proceeds of these offers and we find no direct evidence of such concerns in Board memoranda. Also, we know that Tooth persistently managed reported profits downwards, which is inconsistent with promoting the equity issues. Managerial self-interest may provide an incentive for this prior to a rights offering because Tooth's

rights offers allowed unsubscribed shares to be taken up by other shareholders. The substantial management shareholdings in the company provide an incentive to understate profits prior to the offers, if they expect this to induce a lower share price and a lower acceptance rate among external shareholders. This may allow internal shareholders to acquire a greater proportion of shares and at a lower price than internal profits might suggest, effectively transferring wealth from the external shareholders to management. Such a wealth effect would, of course, only be realised if subsequent information was released informing the market of the 'true' profitability of the entity. However, Tooth's issues were offered at a massive discount on the diluted market value; this would have encouraged external shareholders taking up their rights and so it seems unlikely that such wealth transfers were a motive.

Dividend focus

We previously noted two dividend policy motivations for earnings management. These concern the relationship between investor's expectations regarding reported profit and the magnitude of cash dividends: (1) management reduce reported profits to ameliorate pressure to pay high dividends, because higher distributions may be contrary to either the firm's or managers' long-term interests; and (2) earnings management to smooth earnings may facilitate a stable dividend payout policy, which investors may prefer.

Gibson (1971), describing early Australian practice, argues that the income statement was regarded as little more than a justification for the current dividend.²⁴ Similarly, Buckmaster (2001), citing a series of early articles from the professional literature, identifies a widespread attitude among UK and US investors that 'accounting income measures the proper amount of resources to be distributed as dividends for that period and corporate directors apparently felt pressure to make such distributions' (p.25). Dicksee (1903, p.49) attributes both smoothing and long-term profit understatements to the 'notorious weakness of shareholders' in regard to their dividend demands and their adverse reaction to firms maintaining large reported reserves. Such attitudes persisted into the 1940s, when US accounting regulators explicitly warned companies that reserves for war contingencies were not to be used to smooth in-

come or dividends (Buckmaster, 2001: 25). Investors' expectations have matured since the first half of the 20th century, and the more recent literature that focuses on earnings smoothing identifies the dividend-related objective as facilitating a stable dividend policy, rather than the level of distributed dividends relative to reported profits (e.g. Hepworth, 1953; Ely and Mande, 1996; Fudenberg and Tirole, 1995).

Tooth's 'dividend focus' is revealed in two ways: via the contents of internal company communication, and through the observed relationship between current reported profit and dividends.

A 1931 Board Memorandum argues for the maintenance of secret reserves: 'to enable a dividend to be paid in bad times'.²⁵ A 1933 Board Memorandum asserts the following in regard to the effect of increasing dividends:²⁶

'This will satisfy the shareholders for the time being, but they will probably look for a similar dividend next year and will be disappointed if they don't get it ...'

'... The shareholders are ... already well satisfied with their return from the Company's shares, which has been more stable than probably that of any other organisation throughout the depression.'

The relationship between Tooth's reported profit and internal profit, dividends and disclosed cash equivalents (cash and government bonds) are illustrated in Figure 3. The graphs indicate a close connection between periodic reported profits and dividends, with some divergence becoming more apparent in 1963. A dividend policy based on internal profit would have produced a more erratic stream and, potentially, a greater drain on cash.

4.4. Debt market preferences

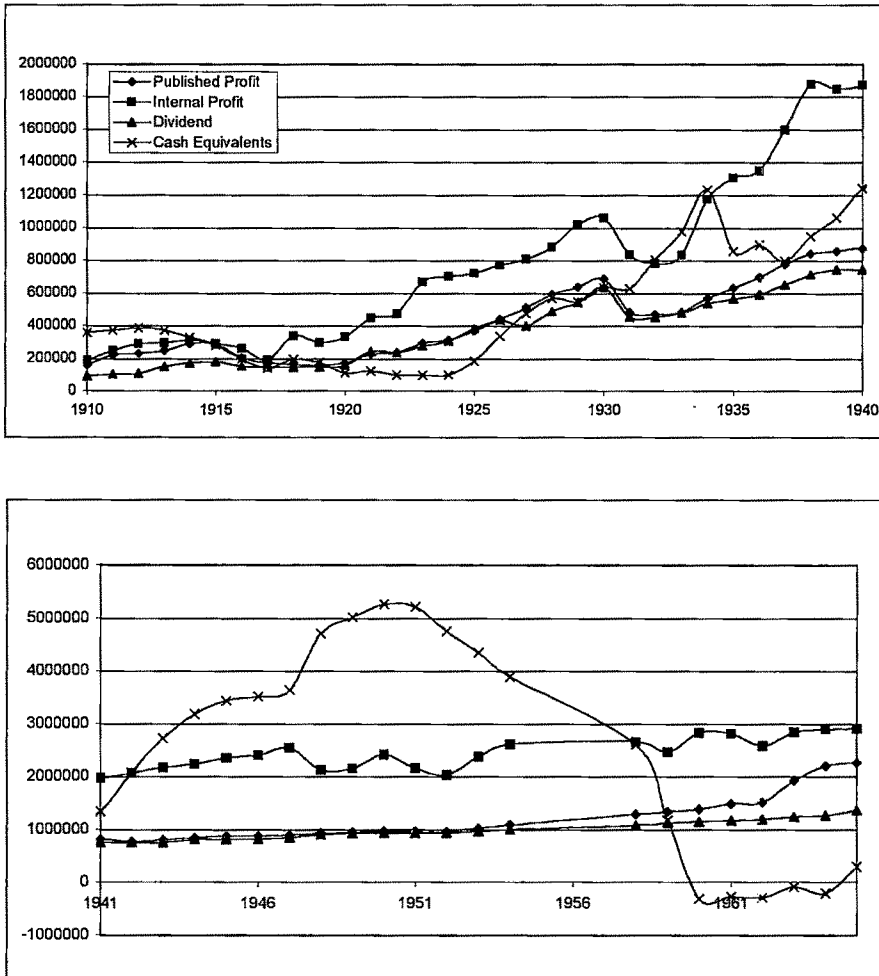
The earnings management literature identifies two aspects of motivations for profit smoothing (or short-run profit-increasing manipulations) arising from a debt market preference for borrowers with stable earnings. First, it is argued that a stable pattern of historical earnings will reduce a lender's perception of the risk of the potential debtor and thus reduce the cost of debt (Hepworth, 1953). Second, where restrictive loan covenants attach to existing loans or debenture issues are written in terms of accounting earnings or ratios, manipulation of reported profit may sometimes allow a borrower to avoid breaching such covenants. Defond and Jiambalvo (1994) report a higher likelihood of profit-increasing manipulations in years prior to the breach of debt covenants. However, neither the cost of debt capital nor the avoidance of debt covenant breaches are relevant, as Tooth had no debt other than low levels of short-term trade credit.

²⁴ Publication of a profit and loss (income) statement was not compulsory for NSW listed companies until 1925, when the Sydney Stock Exchange requirements were strengthened. The NSW companies legislation did not require publication of an income statement until 1936.

²⁵ NBAC. Tooth & Co Archives, N60/287, Tooth's & Toohey's Financial Figures.

²⁶ NBAC. Tooth & Co Archives, N60/286, Tooth's & Toohey's Financial Figures.

Figure 3
Dividend policy, profits and cash equivalents



4.5. Earnings management and political costs

Firms with highly visible earnings may have incentives to understate profits or smooth earnings growth to avoid adverse political attention (Watts and Zimmerman, 1978). Political costs can arise from adverse reactions to reported profits or market power. Costly adverse reactions include labour disputes and demands for higher wages, increases in taxation and excise duties, and industry regulatory responses (such as prohibition, licensing conditions and quotas, controls over trading hours, price controls and actions against anti-competitive behaviour).

Wage pressure

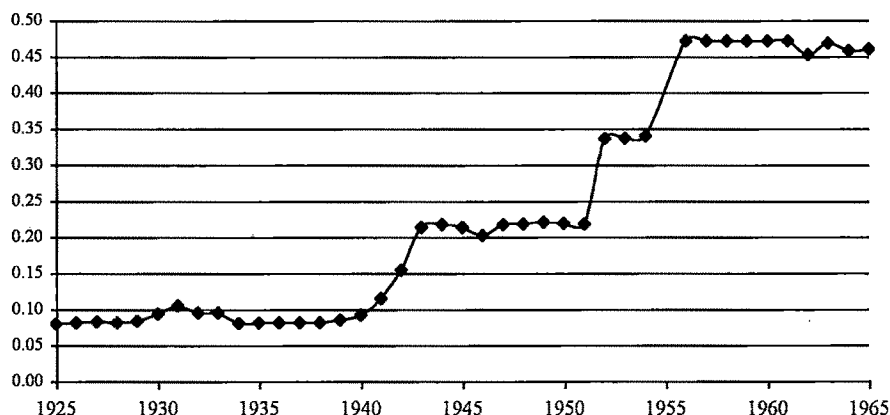
If negotiated wage levels are affected by the employer's capacity to pay wages, as proxied by reported profits, an employer may perceive an advantage in avoiding significant increases in reported profits, particularly in periods of major

wage negotiations. Godfrey and Jones (1999) report a recent positive relationship between the level of unionisation in a firm's workforce and income smoothing in modern Australian firms. Earlier, Hepworth (1953) explicitly observes the potential dangers of perceived excessive profits in regard to industrial relations:

'A sharp increase in reported profits is very likely to produce in the minds of the members of the working force that they should participate to a greater extent in such profits, with resulting demands for wage increases, strikes and general industrial unrest.' (Hepworth, 1953: 33)

There is direct evidence that pressure for 'profit sharing' from wage earners due to increases in reported profits concerned Tooth's board, as observed in board correspondence of 1931 regarding the effect of high dividend payments on the

Figure 4
Excise payable as a proportion of Tooth's production gallonage



labour market:

'The company has already taken advantage of the 10% cut in wages, recently allowed by the Federal Arbitration Court in certain trades, and is now negotiating with the Brewery Employees Union for a similar reduction ... even continuance [of dividends] at the existing rate may give employees an opportunity to criticise the policy of the company.'²⁷

Tooth's recognition of a need to limit or reduce dividends to assuage potential negative labour sentiment is juxtaposed with perceived shareholders' expectations that dividends will appropriate most of the reported earnings. Consequently, understating profits facilitates both lower dividends and less wage pressure.

Taxation and excise

In regimes where the measurement of taxable income is based heavily on accounting income, the manipulation of reported earnings can directly affect taxation cash flows (Hepworth, 1953: 34). This is unlikely to have played a prominent role in Tooth's reporting decisions because, except for the very early years of federal taxation, the taxation rules were not closely aligned with accounting practices and so the calculation of taxable income was largely independent of accounting income. Manipulations of depreciation, allowances against bad debts and the tax provision itself were Tooth's main methods of understating reported profits, but the maximum allowable depreciation rates for tax purposes were stipulated by law and bad debts were deductible only when actually written-off. As reported earlier, Tooth's taxable income (as disclosed in their tax returns) is closely aligned with our measures of their internal profit.²⁸

While we thus discount income taxes as a mo-

tive for Tooth's profit manipulations, excise duty offered greater motivation. Excise duty, a Federal tax on alcohol produced, was the largest single component of Tooth's cost of goods sold, ranging from 40% in 1925 to 73% in 1943. For the years where sufficient information is available to calculate effective excise rates based on Tooth's total gallonage, the relationship between excise and gallonage (in decimalised £s) is shown in Figure 4.²⁹

Excise increases caused two undesirable outcomes for Tooth. First, consumer price sensitivity meant passing on excise increases to customers was likely to reduce total alcohol consumption. In February 1939, Tooth's wrote to the Federal Treasurer to unsuccessfully lobby against a proposed excise rate increase, citing an expected fall in demand of 12.5% should the proposed excise increase proceed.³⁰ Second, passing on increases to consumers induced substitution effects that could have reduced Tooth's profits. For example, wine and spirits became more competitive because excise increases induced smaller percentage increases in their prices, and Tooth's profit margin for their beer was much higher than their margin on wine and spirits for which they were merely resellers. Conversely, excise reductions offered potential gains to the extent that they were not passed on to consumers or through increased consump-

²⁷ NBAC. Tooth & Co Archives, N60/287, Tooth's and Toohey's Financial Figures.

²⁸ The reported profitability of large businesses may affect the likelihood and direction of future changes in company tax rates (Adhikari et al., 2005) although it is unlikely that these effects result in periodic changes in behaviour in stable taxation systems.

²⁹ Explicit amounts for COGS and Excise paid are only available for the period 1925–1965. Prior to 1925 the amount included in internal accounts as Excise expense does not include that amount already embedded in gross profit.

³⁰ NBAC. Tooth & Co Archives, N60/211, Excise.

tion, and to the extent of any substitution from wine and spirits to the higher yielding beer.

A greater concern may have been the extent of substitution between vending units for draught beer sales. Beer was sold in at least three different sized glasses, and the retail price per fluid ounce varied across these glass sizes. Due to the limited divisibility of currency, it was not possible to precisely adjust retail prices per glass to reflect excise increases. A change in the relative prices of the beer sold in 'middies' and 'schooners' resulted in non-uniform price changes which could shift demand towards the lower yielding glass size. Tooth's concern with this substitution effect is evidenced by the extensive research files maintained on the relationship between excise rates and sales mix.³¹

For excise changes to provide an incentive for earnings management, it is assumed that either: reported profits influence the government's perception of brewers' capacity to pay excise; or that reported profits were believed to influence the public's attitudes. Expected influences on the government's perceptions may induce profit manipulations in advance of prospective excise changes. Both expected government and public responses may induce manipulations subsequent to excise changes. It is, of course, arguable that knowledgeable employees of the Federal Treasury (responsible for providing policy advice to the government), did not regard published earnings as a reliable measure of a firm's capacity to pay. However, the likelihood of further government intervention increases with *public* pressure for action (Watts and Zimmerman, 1978). Increases in reported profit following a change in excise rates may induce public resentment that, in turn, may affect regulatory behaviour and consumer demand. The NSW Labor Council, for example, had a standing Liquor Investigations Committee, which was vocally opposed to the 'enormous accrued profits of the breweries'.³² Figure 4 graphs excise rate increases in 1930, 1940, 1941, 1942, 1943, 1952 and 1956. Assuming no other influences, the years subsequent to these should exhibit higher than average income-reducing behaviour, and lower than average growth in reported income.

Regulatory threats

Because brewing is a highly regulated industry, Tooth may have reduced or smoothed profits to influence potential non-tax regulatory responses, including price controls, and market or licensing quotas, if they believed that reported profits influence regulatory decisions. This would be consistent with behaviour observed elsewhere. For example, Jones (1991) reports evidence of income-reducing earnings management by firms subject to import relief investigations and Sivakumar and Waymire (2003) report that in-

creased conservatism in income measurement was significantly associated with regulation of the US Railroad industry in the early 20th century.

Consistent with Watts and Zimmerman (1986; 222–235) regulatory responses are more likely where some degree of monopoly power is evident or competition is weak. Sustaining abnormally high profits is a readily observable signal, to both government and the public, of a non-competitive market. High profits may also attract competition. The economics literature had previously addressed such concerns. For example, Alchian and Kessel (1962) identify potential regulatory responses to excess profitability as incentives to reduce reported profits, Williamson (1963) develops a behavioural model in which reported profits are constrained by the political costs of threatened regulatory changes, and Hall and Weiss (1967) argue that large firms use accounting manipulations to understate reported earnings and so understate the difference in profitability between large and small firms.

Tooth's market power throughout the sample period suggests the threat of regulatory interference was persistent but not of a constant magnitude. It may have been variously affected by Tooth's relative performance, the rate of growth in Tooth's market share, and changes in political and regulatory attitudes. Growth in market share peaked between 1934 and 1940, when Tooth's freeholdings increased from 432 to 605 hotels and market share increased from 80% to 90% of NSW beer consumption and most growth in Tooth's market share occurred near the end of this period. Tooth exhibited the greatest proportionate growth in internal profit in the years 1934–1938, which also included the majority (128) of the hotel acquisitions. Had the cost (or fair value) of the newly acquired hotels appeared on the balance sheet without adjustment, Tooth's increasing domination of the retail market would have been easily discerned by government and by interested sectors of the community (particularly those favouring nationalisation of industry). By understating profit and offsetting the value of fixed assets, the extent of Tooth's increasing market dominance was concealed. The disclosed increase in the net value of property, plant and equipment was only £1.3m compared to the gross increase of £3.8m.

Regulatory concerns in anti-competitive markets often focus on price. In Tooth's case, the only changes in the wholesale price of beer during the entire sample period were those accompanying excise rate changes. While retail prices were official-

³¹ NBAC. Tooth & Co Archives, N60/211 and N20/2664, Excise.

³² *Sydney Morning Herald*, 'Probe into New Beer Price', 1/12/1951.

ly set by the ULVA, and such changes flowed through to Tooth's via rents on public houses and returns on company-operated hotels, we have not found any evidence that Tooth identified a direct link between reported profitability and prices charged other than in regard to excise changes. During the period 1942–1955, when price increases required government ratification, regulatory authorities had the power to inspect a company's books of account. The information provided by Tooth when seeking wholesale price increases following excise rate changes in the 1950s included disaggregated information based on their internal profit figures in support of such applications.³³ While the regulator was well-informed, the public were not. We contend that the main political consequences for Tooth derive from public perceptions of profitability.

Substantial civil and economic disruption also raise political costs and adverse public responses as perceived risks. The study period includes the two world wars and the great depression. These and the other events identified as potentially impacting on Tooth's profit manipulations are summarised in Table 3. We use this data in the next section where we examine Tooth's profit manipulations over time.

5. Tooth's profit smoothing and under-statements over time

The anecdotal internal evidence indicates that Tooth's partial smoothing and persistent understatement of reported profits apparent in Figure 1 are consistent with the avoidance of dividend demands and some profit-based political costs. Less obvious are the reasons behind the varying degrees of earnings management in different years. We first examine the circumstances of particular periods of seemingly aberrant reporting behaviour, incorporating the relevant arguments raised in Section 4. We then use regression analysis to statistically test the relative importance of the various events and circumstances identified in the discussion.

5.1. Periods of seemingly aberrant reporting

Obvious exceptions to the general trend of steady growth in reported profits apparent in Figure 1 are the periods 1916–17, 1930–34, 1940–43, 1951–52, 1956–58 and 1962–1965. These periods also contain most instances of the factors potentially affecting earnings management practice discussed in Section 4 and listed in Table 3, summarised thus:

1916–1917 Genuine deterioration of performance and lower reserves with which to smooth income, 6 p.m. closing 1917.

1930–1934 Excise increase 1930, excise decrease 1932, wage cuts in 1931, retention of cash to finance acquisition of hotels from 1934–1937, anti-trust concerns following acquisition of Resch Ltd.

1941–1943 Excise increases in 1940, 1941, 1942, introduction of rationing, higher dividend pressure due to high cash balance, *Monopolies Act 1941*.

1951–1952 Royal Commission into liquor trade, relaxation of restrictions on clubs, excise rise 1952.

1956–1958 Excise rise 1957.

1961–1965 Introduction of *Companies Act 1961*, Rights issue in 1962.

Period 1: 1916–1917

The financial years ending in 1916 and 1917 exhibited serious declines in profits. Internal profits declined by 34% over the two years (from £290,201 in 1915 to £260,131 in 1916 and £189,747 in 1917). Instead of using the secret reserves to moderate this decline, the reserves were increased and reported profits exaggerated the decline to 39% (from £284,795 in 1915 to £201,923, in 1916 and £172,654 in 1917). Possible reasons for Tooth's failure to use the secret reserves to maintain smooth profits include:

1. The absence of smoothing incentives – however there is no evidence to suggest that smoothing incentives should be lower during this period and merely reporting the internal profits would have lessened the reported declines;
2. Auditor resistance to overstatements – however there is no documentary evidence of auditor resistance to attempted overstatements of current profit and this would not have encouraged understatements;
3. Management belief that the decline was 'permanent' and should be reflected in reported profits in order to enhance the usefulness of current earnings as a predictor of future earnings;
4. Management perceived advantages in reporting the decline.

While 3 above remains a plausible explanation for Tooth's reporting behaviour in this period but does not explain the increased understatements, we argue that the combination of factors detailed below indicate that perceived advantages to Tooth is the more likely explanation. The previously cited internal evidence indicates that dividend reductions were a driving factor and the dividend

³³ NBAC. Tooth & Co Archives, N20/267, Prices.

Table 3
Historical events potentially impacting on earnings management

<i>Financial year</i>	<i>Event</i>	<i>Potential effect on earnings management</i>
1912	Takeover and closure of Marshall's Brewery. Tooth advanced funds to a 3rd brewery for the purpose of taking over Marshalls	Nil. Tooth's interest in the takeover was not publicly known at the time.
1916	6 p.m. closing introduced, Also compulsory rent reductions under Liquor Act	Incentive to depress reported earnings following introduction of these measures.
1919	Introduction of Liquor (Amendment) Act 1919, which extended 6 p.m. closing and introduced compensation for de-licensed premises	Incentive to depress earnings in period prior to finalisation of Act in effort to secure most favourable compensation terms.
1919	Anti-competitive agreement signed with other Brewers	Nil. Existence of the agreement not publicly known.
1920	Rights issue of equity	Ambiguous (see discussion)
1921	Issue of equity to acquire business of Castlemaine Brewery	Incentive to depress reported profit in regard to anti-competitive behaviour.
1924	Acquisition and closure of regional breweries in the Riverina district Rights issue of equity	As above
1928	Referendum considering Prohibition is held and soundly defeated	Long-term incentive to depress earnings prior to referendum (the referendum had been planned since 1919).
1930	Acquisition of Reschs Brewery Excise increase Beginning of Great Depression	Strong incentive to report reduced income.
1931	Government sanctioned wage cuts Reduction in dividends	As above
1932	Excise Reduction	As above
1934	Mass acquisition of freehold hotel properties begins (continues to 1939)	Strong incentive to 'smooth the balance sheet' (to obscure evidence of expansion in retail premises).
1936	Rights issue of equity	Ambiguous (see discussion)
1939	Small excise rise	Incentive to reduce reported income.
1940	Large excise rise	As above
1941	<i>Monopolies Act</i> introduced Large excise rise, rationing of beer and capital works	As above
1942	Large excise rise	As above
1951	Relaxation of legislation allowing explosion in number of licensed clubs Maxwell Royal Commission into the Liquor Industry	As above
1952	Large excise rise	
1955	End of 6 p.m. closing	Ambiguous
1957	Large excise rise	Incentive to reduce reported income.
1961	Companies Act 1961 introduced requiring disclosure of all amounts provided against assets and provision for taxation	Reduced ability (in future years) to reduce reported income.
1962	Rights issue of equity	Ambiguous
1963	First published statement affected by <i>Companies Act 1961</i> requirements	

rate was reduced in 1916, owing to 'increased costs of production' and 'additional taxation'.³⁴ The increased taxation resulted from the introduction of federal income tax, though the effect on total tax payable was only of the order of £10,000. Hotel trading hours were reduced in the 1917 financial year, during which time a mandated reduction in rents also decreased both reported and internal profit. The sustained decrease in reported profit also coincides with the imposition of new taxes and the *Liquor (Amendment) Act 1916* that instituted 6 p.m. closing of public houses. The regulatory changes may have provided sufficient justification for reduced reported profits to avoid the shareholder-related costs associated with a reduction in the dividend rate.

Period 2: 1930–1934

The substantial decrease in reported profit for 1931 and lack of recovery until 1934 largely follows internal profits. However, Tooth had more than sufficient secret reserves to report smooth modest growth in reported profit; indeed, reporting unadjusted internal profits would have accomplished this (see Figure 1). Possible reasons for reporting the decline include political costs of anti-competitive behaviour that may have been higher during this period for several reasons, and opportunities for further expansion:

1. The extent of the depression may have indicated some level of reported profit reduction to be prudent because of a possible public or consumer backlash.
2. Tooth's acquisition of Resch Ltd in 1929 increased their market share from 68% to 80%. Most of the remaining market share belonged to Toohey's Ltd, with whom Tooth fixed minimum retail prices via their domination of the ULVA. Reporting performance superior to that of competitors and other consumer product markets may have risked a greater likelihood of increased regulatory action in the brewing industry.
3. Tooth was vocal in its objection to the 1930 excise increase, and reporting a strong fall in profits immediately thereafter would have strengthened their case for repeal. Despite a slight recovery in internal profits, reported profits were kept relatively flat.³⁵ Subsequently, a 1933 Board memorandum discussing possible uses of undisclosed reserves made the following comment:

'A substantial increase in dividend at this stage might easily lead to a certain amount of public resentment. During the debate in the Federal House on the excise reduction, suggestions were made that the trade had been treated too liberally ... a substantial increase of dividend now would tend to revive a feeling of public resentment and might easily lead to the excise being increased ... In the meantime we are actually aiming for a further reduction in excise.'³⁶

4. The above memorandum also reflects the perceived connection between dividend policy and political costs. Given that dividend policy was linked to reported income, this juxtaposition indicates a further incentive to depress reported earnings. Dividends were reduced in the 1931 financial year and did not return to their 1930 level until 1936.
5. Although the depression was harmful to the trading performance of Tooth, discounted asset prices also provided an opportunity for a significant expansion of freehold properties. Tooth's expectations in this regard is evident in the following extract from a 1931 Board memorandum considering dividend policy:

'With the general decline in market value of properties the Company should have opportunities of acquiring valuable freehold hotel properties at prices which would not have been credited say twelve or eighteen months ago ... provided the Company has sufficient ready money available, it will be able to secure valuable trade outlets in solid districts at very low cost.'³⁷

During this period Tooth increased its freehold hotels from 400 to 553. The related need for cash resources and the possible political costs associated with the depression, growth in market share, and lobbying in relation to excise, meant that lower dividends and lower reported profits were desirable. The need for cash is evidenced by a rights issue of equity in 1935.

Avoiding the possible political costs associated with the public recognition of the extent of the company's grip on the retail market, which would be facilitated by disclosing these acquisitions, meant that the extent of the increase in fixed assets had to be kept off the balance sheet, further requiring the concealment of profits. Despite an increase in gross fixed assets of £3.6m (based on internal records), net fixed assets increased by just £1.3m on the published balance sheet.

Period 3: 1941–1943

Despite the pressures of wartime restrictions on domestic demand, Tooth's internally reported profits grew steadily during WWII. Published profits, however, show a decline in both 1941 and 1942. Public and political concerns regarding war-

³⁴ NBAC. Tooth & Co Archive, N20/4000, Tooth's Annual Reports and Balance Sheets.

³⁵ From 1932 to 1933, internal profit grew 6.26% but reported profits were increased by only 3.15%.

³⁶ NBAC. Tooth & Co Archives, N60/286, Tooth and Tooheys Financial Figures.

³⁷ NBAC. Tooth & Co Archives, N60/287, Tooth and Tooheys Financial Figures.

time sacrifices and profiteering may have indicated some level of reported profit reduction to be prudent. Government restrictions on repairs and maintenance expenditure also caused the balance of cash equivalents to rise significantly, potentially adding to pressure for dividends if higher profits were disclosed. Superficially, the introduction of the 1941 *Monopolies Act* may appear to have encouraged profit understatements but, as noted earlier, Tooth's legal advice indicated that this legislation was not a cause of great concern and was thus unlikely to have motivated reporting behaviour. However, excise duties again appear to have been a concern. After a very small rise in excise in the 1939 financial year, the excise rates rose three times from late 1940 to late 1942. The aggregate increase in the excise rate during this period was 123% of the 1939 excise rate.

Period 4: 1951–1952

The 1951 Maxwell Royal Commission into the Liquor Industry posed a substantial political threat. Its terms of reference covered most aspects of the liquor industry, including the tied-house system, concerns over the monopolistic behaviour in the industry, and the issue of 6 p.m. closing. The Commission sat through 1951–1952 and its findings were generally known in 1953 and formally published in 1954. From Tooth's archives it is clear that very substantial time and resources were devoted to submissions to this inquiry. Over such a period Tooth's earnings must have been highly visible and sensitive.

Most of Tooth's hotel leases were fixed for three to five years and significant inflation in the early 1950s adversely affected Tooth's internal profit.³⁸ Nonetheless, internal profit remained roughly double the reported profit. Tooth chose to report a small decrease in profit in 1951 and a trivial increase in 1952.

Period 5: 1956–1958

The major event of this period was an excise increase affecting the 1957 financial year. Missing data for 1955–1956 limits our analysis of this period but the limited evidence available is consistent with the observed behaviour in other periods following an excise increase. Reported profit growth was near zero.

Period 6: 1961–1965

The *Companies Act (New South Wales) 1961* was based on the provisions of the UK *Companies Act 1948* and required companies to disclose provisions for taxation, the gross and net amounts of fixed assets and receivables and various other increases in the detail of the income statement. From Tooth's perspective, the Act caused a significant reduction of scope for understating reported profit. The requirement that 'provisions' against assets had to be disclosed meant that they must be credi-

ble. Furthermore, the requirement to disclose the provision for taxation allowed the market, for the first time, to estimate the company's taxable income as a check on the published profit.

The first of Tooth's published statements to reflect the new disclosure requirements were for the year ending 31 March 1963. In preparing the financial statements for that year, the previously undisclosed reserve accounts were written down by approximately £13m. Approximately £11m of this was matched by a reduction in the value of the 'cost' accounts for fixed assets (thus leaving net asset values unchanged).³⁹ The 'Provision for Doubtful Debts' was reduced by £2m and approximately £400,000 of excessive depreciation allowances were reversed. Published net profit rose from £1.5m to £1.9m (by far the greatest recorded single-period increase in the firm's profitability). Similarly, the understatement of published income relative to the level of internal income reached its lowest point since 1916.

In 1962 the company issued shares via a rights issue (at a significant discount) for £1.5m. From an agency theory perspective, the timing and terms of this issue may have a managerial self-interest motive. Returns on Tooth's equity in subsequent years were 21% and 30% respectively (double the market yield) and any shareholder who participated in the rights issue enjoyed considerable gains. The low earnings growth in the years prior to this issue appear consistent with management discouraging external shareholders from exercising their rights to buy shares, leaving more for internal shareholders. Similarly, at the time of the issue Tooth's were well aware of the inflationary effect that the 1961 *Companies Act* would have on their reported profits for years 1963 onwards, suggesting that the abnormal subsequent stock returns were to some extent predictable by management. However, we have no evidence regarding the allocation of shares under the rights issue. Furthermore, because the rights price represented such a discount on the diluted market value, it seems unlikely that the profit-reducing behaviour would have significantly impacted on the external shareholders' uptake of the rights issue. It is entirely plausible that the rights issue simply corrected a working capital shortage which had developed since the late 1950s. Massive investment in outer suburban hotels, inspired by the end of 6 p.m. closing in 1955, reduced cash balances from £2.6m in 1955, to -£0.3m in 1957. Negative overall cash balances persisted until the rights issue in 1962.

³⁸ Retail Price Index inflation for 1950, 1951 and 1952 was 9.22%, 10.97% and 22.81% respectively.

³⁹ The likelihood that net asset values remained significantly negatively biased is evidenced by the fact that within eight years asset revaluations effectively doubled the disclosed 1963 value of fixed assets.

5.2. A statistical test of the impact of particular events on earnings understatements

Our discussion of events and examination of the graphical evidence exposes discernible differences in particular years, and also emphasises the complexity of events in some periods. Without a basis for weighting the possible multivariate effects, our interpretive analysis is not singularly persuasive. Using a simple regression, we attempt to relate differences in understated profits to particular recurring events. We consider three types of events from Table 3 that we can attribute to particular years:

1. Expected lobbying by Tooth in relation to prospective regulatory changes, for which we expect to observe a larger profit understatement in the year in which lobbying was known to be high (e.g. when trading hours and prohibition were on the agenda) or prior to any actual regulatory change (e.g. 6 p.m. closing).
2. Increases in excise duties, for which we expect a larger understatement of profit in the reporting period following the announced increase.
3. Competition-reducing actions by Tooth (such as price agreements, takeovers and substantial public house acquisitions). We expect larger profit understatement in the reporting period following the acquisition.⁴⁰

The above events are measured using dummy variables, which assume a value of one if the particular event occurred in a given year and zero otherwise.

We measure earnings understatements in ratio form (internal profit/published profit) to avoid scale issues, such as inflation. Because of the persistence of earnings understatements, we use the change in the earnings understatement ratio as the dependent variable and control for changes in the growth in internal profit. Because of the strong evidence of smoothing in our graphical analysis, we also include the square of the change in growth in internal profit. More complex exponential forms may provide better control for smoothing but, because the change in growth variable is less than one in all cases except 1918, we opt for the simpler form but subsequently test the adequacy of the model specification using Ramsey's RESET.

By controlling for growth and smoothing in this manner, the estimated regression coefficients for Excise, Lobby and Competition in Model 1 test for effects on changes in earnings understatements beyond the level which can be explained purely by changes in the rate of growth in internal income.

$$\Delta \text{Understatement}_t = a + b_1 \Delta \text{Growth}_t + b_2 \Delta \text{Growth}_t^2 + b_3 \text{Lobby}_t + b_4 \text{Excise}_{t-1} + b_5 \text{Competition}_{t-1} \quad (1)$$

Where

$\Delta \text{Understatement}_t$ = Changes in the earnings understatement ratio, calculated thus: $(I_t/P_t - I_{t-1}/P_{t-1}) / (I_{t-1}/P_{t-1})$

ΔGrowth_t = Changes in the growth in internal earnings, calculated thus: $((I_t - I_{t-1}) - (I_{t-1} - I_{t-2})) / (I_{t-1} - I_{t-2})$

ΔGrowth_t^2 = the square of ΔGrowth_t

I_t = internal profit for year t

P_t = published profit for year t

Lobby_t = 1 in years where lobbying behaviour is likely to be abnormally high and 0 otherwise.

Excise_{t-1} = 1 if an excise rate increase occurred in the previous year and 0 otherwise.

Competition_{t-1} = 1 in periods where Tooth made acquisitions of other breweries or significant numbers of public houses and 0 otherwise.

Descriptive statistics and the correlation matrix for the dependent, control and test variables are presented in Table 4. The correlation matrix suggests possible multicollinearity amongst regression variables; however variance inflation factors and condition indices indicate no significant multicollinearity problems in the regression model.⁴¹ Potential for non-normality in the dependent variable is tested using the Kolmogorov-Smirnov test, which rejects the null hypothesis of normality at $p=0.001$. However, this result is attributable to the abnormally high growth measure observed in 1918. Deletion of this outlier results in a Kolmogorov-Smirnov statistic that fails to reject the null of normality ($p=0.200$). Subsequent regression analysis was conducted both with and without the outlying observation. With missing profit data for 1955 and 1956, and the requirement for lagged profits, the number of sample years is 51.

We predict positive coefficients for all the variables, indicating that the variable is associated with an increased level of understatement, relative to the previous financial period. The results for the regression are reported in Table 5.

The test variables Excise, Lobbying and Compensation are significantly associated with changes in proportionate earnings understatement in the predicted direction. Thus, we confirm the apparent associations observed in Table 3.

⁴⁰ Other events canvassed earlier do not occur in sufficient numbers to test their impact in this manner.

⁴¹ The largest variance inflation factor was 2.58 and the largest condition index was 3.18.

Table 4
Descriptive statistics

Dummy variables

Variable	N	Minimum	Maximum	Frequency
Excise _{t-1}	51	0	1	6
Lobby _{t-1}	51	0	1	6
Competition _{t-1}	51	0	1	9

Continuous variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
$\Delta I_t/P_t$	51	-0.196	0.884	0.012	0.157
ΔGrowth_t	51	-0.505	1.430	0.019	0.261
ΔGrowth_t^2	51	0.000	2.050	0.0674	0.287

Correlation matrix

Variable	$\Delta I_t/P_t$	ΔGrowth_t	ΔGrowth_t^2	Lobby _t	Excise _{t-1}	Competition _{t-1}
$\Delta I_t/P_t$	1.000					
ΔGrowth_t	0.762	1.000				
ΔGrowth_t^2	0.790	0.752	1.000			
Lobby _t	0.413	0.269	0.366	1.000		
Excise _{t-1}	0.103	-0.036	-0.061	-0.133	1.000	
Competition _{t-1}	0.025	-0.154	-0.006	-0.169	-0.169	1.000

Table 5
Results of regression of change in profit understatement ($\Delta I_t/P_t$)

Regression results	R Square	Adjusted R Square	SE of the estimate	F test significance	Durbin-Watson
N = 51	0.759	0.732	0.082	0.000	1.752*
Explanatory variables	B	SE	t	Significance	
Constant	-0.043	0.015	-2.86	0.012 (2-tail)	
ΔGrowth_t	0.266	0.068	3.87	0.000 (2-tail)	
ΔGrowth_t^2	0.218	0.065	3.37	0.002 (2-tail)	
Excise _{t-1}	0.096	0.037	2.62	0.006 (1-tail)	
Lobby _t	0.098	0.039	2.51	0.008 (1-tail)	
Competition _{t-1}	0.067	0.032	2.09	0.021 (1-tail)	

*The serial correlation of residuals lies in the inconclusive range of the Durbin-Watson critical values (95% confidence level). The Durbin-Watson H statistic of 0.120 and Breusch-Godfrey statistic of 0.139 (for lag = 1), which allow for endogeneity within the model, fail to reject the null hypothesis that there is no autocorrelation between residuals. The critical value for these chi-square statistics is 3.84 (95% confidence level). Breusch-Godfrey statistics were also computed for lags of one to four years and again failed to reject the null. The Breusch-Pagan statistic (0.05), which tests for possible heteroskedasticity is not significant ($p=0.821$).

Because of the potential leverage exerted on the regression by the abnormally large growth measure observed in 1918, the regression model was also estimated without this observation (not reported). The only difference in the sign or significance of the explanatory variables is a reduction in the significance of ΔGrowth_t^2 to $p=0.484$.

The Breusch-Pagan statistic reported in Table 5

does not indicate any heteroskedasticity problems. Although the Durbin-Watson H statistics and Breusch-Godfrey statistics reported in Table 5 indicate that there is no induced serial correlation in the residuals, we also estimate the regression without ΔGrowth and ΔGrowth_t^2 . If we include ΔGrowth but omit ΔGrowth_t^2 , then Competition, Excise and Lobby remain significant and positive,

but the regression diagnostics (Ramsey's RESET) indicate that non-linear combinations of the explanatory variable would improve the model. When both ΔGrowth and ΔGrowth_t^2 are omitted, the R^2 is substantially lower and Competition is no longer significant in the under-specified model. Augmented Dickey-Fuller tests, using lags of one to four years, indicate that the change in the earnings understatement ratio and the control variables (ΔGrowth and ΔGrowth_t^2) are stationary (at 95% confidence level).

6. Concluding comments

The use of secret reserves for manipulating earnings is broached in the contemporaneous professional literature and noted in the accounting and business research literature. However, there has been little previous evidence indicating the magnitude of such practices. Further, while incentives were usually phrased in the context of investors' dividends expectations, this case demonstrates that political costs, in the sense of positive accounting theory, also explain much of the periodic earnings management.

There is clear evidence that Tooth smoothed reported profits but we also identify persistent understatements in reported profits, with the relative reliability of reported profit varying considerably over time. In particular, periods of high political costs or incentives to influence regulatory actions (particularly in the case of excise changes) are associated with greater understatements, even in circumstances where the company's internal profit was increasing. Our investigation also reveals that Tooth's management of the balance sheet was a strategic response to political costs associated with competition (market share) concerns. There is, of course, a necessary relationship between income and balance sheet management.

Given the limitations associated with the relatively small number of observations in our dataset and the coarseness of our binary proxies for earnings management incentives, caution should be applied in evaluating our statistical results. However, the results obtained complement the descriptive historical evidence presented in the paper. This complementarity between our quantitative and qualitative analyses provides a stronger basis for our conclusions than either analysis considered singularly.

While caution must be exercised in generalising from an analysis of the behaviour of a single firm in a single market, there are undoubted similarities between the reporting incentives facing Tooth and those affecting other large firms operating in markets with weak competition and subject to similarly ineffective disclosure regimes. While the Tooth case is complicated by the politically sensitive nature of the firm's product, most of the issues raised

apply more generally.

The importance of these results for contemporary accounting practices pertains to the impact of disclosure regulation, as exemplified by the role of the *Companies Act 1961* in forcing Tooth's abandonment of persistent large scale earnings understatement. Without such regulation, it seems unlikely that the improved transparency and accuracy would have occurred.

These results indicate that considerable caution should be exercised in analyses that rely on historical time series of reported accounting numbers – notably profits, equity and assets. This is especially so for periods predating regulatory disclosure requirements of the kind that curtailed much of Tooth's mis-reporting practices, such as the *1961 Companies Act* in NSW and the *1948 Act* in the UK. For the business historian, this builds upon the work of Marriner (1980) and Arnold (1996, 1998), who note the importance of secret reserves for the reliability of historical published earnings, by indicating the magnitude of such problems and by relating earnings management activity to both political costs and regulatory changes.

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The value relevance of disclosures of liabilities of equity-accounted investees: UK evidence

John O'Hanlon and Paul Taylor*

Abstract—This study examines the value relevance of mandated disclosures by UK firms of the investor-firm share of liabilities of equity-accounted associate and joint venture investees. It does so for the six years following the introduction of FRS 9: *Associates and Joint Ventures*, which forced a substantial increase in such disclosures by UK firms. Since the increased disclosure requirements were partly motivated by concern that single-line equity accounting concealed the level of group gearing, and in light of previous US results, it is predicted that the mandated investee-liability disclosures have a negative coefficient in a value-relevance regression. The study also examines whether value-relevance regression coefficients on investee-liability disclosures are more negative for joint ventures than for associates and whether they are more negative in the presence of investor-firm guarantees of investee-firm obligations than in the absence of such guarantees. The study reports that the coefficient on all investee-liability disclosures taken together has the predicted negative sign, and is significantly different from zero. It finds little evidence that the negative valuation impact of liability disclosures is stronger for joint venture investees overall than for associate investees overall, or stronger for guarantee cases overall than for non-guarantee cases overall. There is, however, some evidence that the impact for joint venture guarantee cases is stronger than that for joint venture non-guarantee cases and stronger than that for associate guarantee cases.

Key words: Equity accounting; joint ventures; associates; FRS 9; value relevance

1. Introduction

By testing for their value relevance, this study examines the usefulness to investors of mandated disclosures by UK firms of the investor-firm share of liabilities of equity-accounted associate and joint venture investees. The study uses UK data for the period from 1998 to 2003, immediately following the date of the introduction by the UK's Accounting Standards Board (ASB) of FRS 9: *Associates and Joint Ventures* (ASB, 1997).

Motivated in part by concern that single-line equity accounting was being used as an off-balance-sheet-financing device which had the effect of concealing the level of group gearing (ASB,

1996), FRS 9 introduced for the first time strict thresholds governing disclosures by UK firms of the investor-firm share of the underlying gross assets and liabilities of equity-accounted investees, and forced a substantial increase in such disclosures. On the grounds that joint ventures are subject to joint control by the investor firm whereas associates are only subject to its significant influence, FRS 9 also introduced a distinction between associate investees and joint venture investees, requiring a higher and more prominent degree of disclosure in respect of joint ventures. We examine the value relevance of the FRS 9-mandated disclosures of the liabilities of equity-accounted investees, which are the amounts by which the net investments in investees for which disclosures are made would have to be grossed up to give the investor-firm share of the gross assets and liabilities of those investees. In light of the concerns about concealment of group gearing that partly motivated the investee-liability disclosure requirements of FRS 9 and in light of the findings of previous US research, we predict that the mandated disclosures are negatively associated with the market value of equity of the investor firm, and therefore have a negative coefficient in a value-relevance regression. In light of the possibility that the creditors of joint ventures might be more likely than those of associates to have explicit or implicit recourse to

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the assets of the investor firm and in light of the greater and more prominent disclosure that FRS 9 required for joint ventures relative to associates, we also examine whether the value-relevance regression coefficient on investee-liability disclosures is more negative for joint ventures than for associates. Furthermore, because of the recourse to the assets of the investor firm conferred by an investor-firm guarantee of investee-firm obligations, and in light of the findings of previous US research, we examine whether the value-relevance regression coefficient on investee-liability disclosures is more negative in the presence of investor-firm guarantees than in the absence of such guarantees.

The findings of the study indicate that disclosures of liabilities of equity-accounted investees, which enable equity-accounted net investments to be grossed up by financial statement users, are negatively associated with the market value of equity of the investor firm. This is consistent with the concerns about off-balance-sheet financing that helped motivate the requirement for such disclosures under FRS 9. The study finds little evidence that the negative valuation impact of liability disclosures is stronger for joint venture investees overall than for associate investees overall, or stronger for guarantee cases overall than for non-guarantee cases overall. There is some evidence that the impact for joint venture guarantee cases is stronger than that for joint venture non-guarantee cases and stronger than that for associate guarantee cases.

The remainder of the paper is organised as follows. Section 2 gives the background to the study, outlining relevant issues relating to accounting for associates and joint ventures and the results of related research. Section 3 describes the research design. Section 4 gives details of the data used in the study. Section 5 reports the results. Section 6 concludes.

2. Background

This section provides background for the empirical work reported in the study. Subsection 2.1 outlines the history of the accounting for investments in associates and joint ventures in US, international and UK generally accepted accounting practice (GAAP), with particular reference to the disclosure of the gross assets and liabilities of equity-accounted investees and to the provisions of the UK accounting standard FRS 9. Subsection 2.2 outlines related research. Subsection 2.3 summarises the section.

2.1. Accounting for associates and joint ventures

Associate and joint venture investees are each subject to an important degree of influence by the investor firm, where the influence falls short of the control that would classify the investee as a subsidiary of the investor firm. In the case of a joint venture, the investor firm and one or more other parties exercise joint control under a contractual arrangement; in the case of an associate, the investor firm merely exercises significant influence.¹ Some accounting regimes have drawn a distinction between the two types of investee, and others have not.

Until the early 1970s, an investment by one firm in another where the investee firm was not a subsidiary of the investor firm was generally accounted for at cost in the balance sheet, and income was recognised when a dividend was received from the investee. The inadequacies of such accounting for what might be vehicles for important activities motivated the development of a more informative method of accounting for investee firms over which the investor firm had significant influence short of control. Under this method, termed the equity method, the investee is accounted for in the investor firm's balance sheet as a single-line item comprising cost plus the investor-firm share of the post-acquisition change in the investee's equity, and in its income statement as the investor-firm share of aggregated components of investee net income. Use of the method was pioneered by the Royal Dutch Shell group in 1964 (Ernst & Young LLP, 2001), and was introduced into US GAAP and UK GAAP in 1971. The relevant US accounting standard was APB Opinion No. 18: *The equity method of accounting for investments in common stock* (Accounting Principles Board, 1971), and the relevant UK accounting standard was initially SSAP 1: *Accounting for Associated Companies* (ASC, 1971). Subsequently, international accounting standards incorporated the method in IAS 28: *Investments in Associates* (IASB, 2003a) and IAS 31: *Interests in Joint Ventures*, (IASB, 2003b), which were first issued in 1988 and 1990, respectively.

Concern has been expressed in some quarters that single-line equity accounting may reflect insufficient information about the activities of investee firms, a particular concern being that such accounting could be used to conceal the level of investor-group debt (Bierman, 1992; ASB, 1994; ASB, 1996; Crichton, 1996; Johnson and Holgate, 1996). This has led to the development of various methods for reflecting in the financial statements of investor firms more detailed information from the underlying income statements and balance sheets of equity-accounted investees. These methods include proportionate consolidation, where the investor-firm share of investee-firm financial-

¹ See FRS 9: *Associates and Joint Ventures* (ASB, 1997), IAS 28: *Investments in Associates* (IASB, 2003a) and IAS 31: *Interests in Joint Ventures* (IASB, 2003b) for definitions of associates and joint ventures in UK and international GAAP.

statement line items is merged with the investor-firm line items, the expanded equity method, where the investor-firm share of investee-firm line items appears in the investor firm's financial statements but is not merged with the investor-firm line items, and note disclosures. There has been much debate about how far along the spectrum from single-line equity accounting to proportionate consolidation regulators should go with regard to associates and joint ventures, with single-line equity accounting being seen by some as reflecting an inadequate amount of information about important activities and proportionate consolidation being seen by some as implying a greater degree of control than is actually exercised (ASB, 1994; Milburn and Chant, 1999). Differences of opinion have been reflected in differences across regimes in accounting for associates and joint ventures.

With regard to disclosure of liabilities of equity-accounted investees, the US's APB Opinion No. 18 states that, where material, it might be necessary to disclose information on the assets and liabilities of the investee firm. Materiality thresholds are not defined by APB Opinion No. 18, but have been defined for SEC registrants by the SEC's Regulation S-X. This requires note disclosure of summarised information on assets, liabilities and results of operations of equity-accounted investees that exceed specified materiality thresholds, and the filing of separate financial statements of equity-accounted investees that exceed higher materiality thresholds (Accounting Series Release 302: *Separate Financial Statements Required by Regulation S-X*, SEC, 1981).² No distinction is drawn between associates and joint ventures with regard to the required method of accounting or the required disclosures.

International GAAP has distinguished between the method of accounting for associates and the method of accounting for joint ventures, including with regard to the way in which investee liabilities are reflected in investor-firm financial statements. When first issued in 1988, IAS 28: *Investments in Associates* required associates to be accounted for by the equity method, with no requirement for disclosure of liabilities of associates. However, the current version of the standard, effective for accounting periods beginning on or after 1 January 2005, requires disclosure of summarised financial information of all associates, including their aggregate assets, liabilities, revenue and net income (IASB, 2003a). IAS 31: *Interests in Joint Ventures* requires that joint ventures be accounted for either by proportionate consolidation, which is the preferred method, or by the equity method as for associates. However, the IASB has recently sig-

nalled its intention to eliminate the main difference between IAS 31 and the corresponding US GAAP provisions by removing the option to account for joint ventures by proportionate consolidation and requiring that they be accounted for by the equity method (IASB, 2007). This will remove a significant distinction between the methods of accounting for associates and for joint ventures, although disclosures may continue to be made separately for each class of investee.

Similar to APB Opinion No. 18, the UK's SSAP 1 required that, if materially relevant from the perspective of the investor firm, information on the assets and liabilities of an equity-accounted investee should be disclosed in the investor firm's financial statements. However, no materiality thresholds were defined and, for the period during which SSAP 1 was in force, disclosure of such information by UK firms was rare (ASB, 1997, appendix 3, paragraph 3). During the 1990s, there was concern that this might be allowing equity-accounted investees to be used as a means of concealing debt (ASB, 1994; ASB, 1996; Crichton, 1996; Johnson and Holgate, 1996). Furthermore, on the grounds that joint ventures and associates are different in that the former is subject to joint control by the investor firm whereas the latter is merely subject to its significant influence, there was some debate as to whether joint ventures should be treated differently from associates. These concerns were reflected in the development by the UK's ASB of FRS 9: *Associates and Joint Ventures*, which came into effect for accounting periods ending on or after 23 June 1998. This defined for the first time strict thresholds governing the disclosure by UK firms of the investor-firm share of the liabilities of equity-accounted investees, bringing about a significant increase in such disclosure. It also introduced a clear distinction between associates and joint ventures, requiring a higher and more prominent degree of disclosure for the latter.

The disclosures required by FRS 9 took three principal forms. First, firms were required to account for all joint ventures by the gross equity method, whereby the investor-firm share of the investee firm's gross assets and gross liabilities appeared on the face of the investor firm's balance sheet and the investor-firm share of the investee firm's sales revenue appeared on the face of the investor firm's income statement. Second, if the investor-firm share of one or more designated items for aggregate associates or for aggregate joint ventures exceeded 15% of the corresponding item for the investor firm, a 15% materiality disclosure for that class of investee was required. The designated items were (i) gross assets, (ii) gross liabilities, (iii) sales revenue and (iv) the three-year average of operating profits. If the 15% threshold was ex-

² The relevant Regulation S-X rules are 1-02(w), 3-09 and 4-08(g).

ceeded, the investor firm had to disclose in aggregate its share of the following items of the investees: sales revenue, fixed assets, current assets, liabilities due within one year, and liabilities due after one year. Third, if for any individual associate or joint venture the investor-firm share of any of the four designated items exceeded 25% of the corresponding item for the investor firm, a 25% materiality disclosure was required. In this case, the investor firm had to disclose its share of the following in respect of the individual investee: sales revenue, profit before tax, taxation, profit after tax, fixed assets, current assets, liabilities due within one year, liabilities due after one year.

It is notable that, although it was issued at a time of increasing support by the ASB for the International Accounting Standards Committee (IASC) harmonisation project, FRS 9 differed from the then current international accounting practice, as reflected in IAS 28 and IAS 31, in a number of significant respects. Areas of difference included the requirement in FRS 9 to disclose information about liabilities of associates, at a time when no such requirement existed in IAS 28, the lack of any provision within FRS 9 for proportionate consolidation, at a time when IAS 31 strongly encouraged its use in accounting for joint ventures, the definition of significant influence, criteria for exclusion from the requirement to apply equity accounting, the reporting of components of equity-accounted income, the treatment of loss-making equity-accounted investees, and the definition of types of joint venture (Ernst & Young LLP, 2001, ch. 7, Section 6). It is also notable that the revision to IAS 28 that post-dated FRS 9, requiring the disclosure of associate liabilities for accounting periods beginning on or after 1 January 2005, and the proposed revision to IAS 31, requiring joint ventures to be accounted for by the equity method, are moving international accounting practice with regard to the disclosure of the liabilities of equity-accounted investees closer to the FRS 9 position.³ However, it should also be noted that the proposed change to IAS 31 runs counter to the path taken by FRS 9 in one respect, in that it substantially reduces the difference between the method used to account for investments in joint ventures and that used to account for investments in associates.

2.2. Related research

A number of previous studies examine the usefulness to investors of accounting disclosures re-

garding associates and joint ventures, focusing on their value relevance as measured by association with market value, on their risk relevance as measured by association with risk measures, or on their forecasting relevance as measured by their contribution to the forecasting of accounting numbers.

Motivated by the possibility that US GAAP's lack of distinction between associates and joint ventures might limit the usefulness of US accounting data, Soonawalla (2006) examines the relevance to investors of associate and joint venture disclosures in Canada and the UK for the periods 1995–2000 and 1997–2000, respectively. Relevance is measured both by forecasting relevance and by value relevance. The focus is on the potential incremental relevance of (i) equity-accounted income disaggregated into associate and joint venture components, beyond equity-accounted income of associates and joint ventures taken together, (ii) single-line equity-accounted net investment disaggregated into associate and joint venture components, beyond the single-line equity-accounted net investment in associates and joint ventures taken together, and (iii) joint venture revenues and expenses, beyond joint venture earnings. The study finds evidence that disaggregated associate and joint venture information is forecasting-relevant and value-relevant beyond aggregate information, and therefore suggests that failure to distinguish between associates and joint ventures may result in the concealment of valuable information. It does not consider the effect of investee-liability disclosures or of investor-firm guarantees.

Lourenço and Dias Curto (2006), using UK data from 1999 to 2004, report that investors value the gross assets of joint venture investees differently from investor-firm gross assets and that they value the liabilities of joint venture investees differently from investor-firm liabilities. The study does not consider associates or the effect of investor-firm guarantees.

For Canadian firms for the period from 1995 to 2000, Kothavala (2003) examines whether information on joint venture investees presented using proportionate consolidation, which reflects the liabilities of joint venture investees, explains market risk measures better (is more risk-relevant) than information based on single-line equity accounting, which does not. The study is motivated in part by suggestions that the use of equity accounting rather than proportionate consolidation, by failing to reflect liabilities of investees, may allow those investees to be used as an off-balance-sheet-financing device (Bierman, 1992). The results of the study are mixed. Accounting numbers based on proportionate consolidation are more risk-relevant than those based on single-line equity accounting when risk is measured using price volatility, but are less risk-relevant when risk is measured using

³ Unlike the international standards, FRS 9 made distinctions with regard to materiality, which resulted in liabilities of some non-material associates not being disclosed and details of particularly material associates and joint ventures being disclosed individually. Also, it required that disclosures with regard to aggregate joint ventures be made on the face of the balance sheet using the gross equity method.

bond ratings. A related study by Stolzhus and Epps (2005) uses US data for the period from 1996 to 1999 to examine whether accounting data constructed as if joint ventures are accounted for by proportionate consolidation explain risk premia better than reported accounting data based on the equity method. The study reports that, although proportionate consolidation does not dominate equity accounting in explaining risk premia for all joint ventures taken together, it does so for joint ventures where obligations are guaranteed by the investor firm.

Graham, King and Morrill (2003), using Canadian data for the period from 1995 to 2001, find that reported accounting data, in which joint ventures are accounted for by proportionate consolidation, have greater forecasting relevance than accounting data constructed as if joint ventures are accounted for by the equity method.

Bauman (2003) uses a sample of 150 US firm-years for the years 2000 and 2001 to examine the value relevance to investors in the investor firm of disclosures of the liabilities of equity-accounted investees, which he terms off-balance-sheet activities concealed by the equity method of accounting. Because of the possibility that investors in the investor firm might place a higher weight on investee-liability disclosures if there is an investor-firm guarantee of investee-firm obligations, a distinction is drawn between guarantee cases and non-guarantee cases. No distinction is drawn between joint ventures and other equity-accounted investees. In regression models in which the dependent variable is the market value of equity and explanatory variables include investee-liability disclosures, the coefficient on investee-liability disclosures is negative both in guarantee cases and in non-guarantee cases, both in 2000 and 2001. Consistent with investors placing greater weight on investee-liability disclosures in the presence of an investor-firm guarantee, the coefficient for guarantee cases is significant in both years whereas that for non-guarantee cases is significant in only one year, and the guarantee coefficient is

lower (more negative) than the non-guarantee coefficient in both years.

2.3. Summary

The issues of whether and how to reflect in the financial statements of investor firms information about equity-accounted investees have been debated extensively and have generated a considerable degree of regulatory activity, some of which is ongoing at the time of writing. Prior research has reported evidence on the value-relevance, risk-relevance and forecasting-relevance of such information, and has found that investors view information about equity-accounted investees differently depending upon whether it relates to associates or to joint ventures and depending upon whether or not there is an investor-firm guarantee of investee-firm obligations. A US study by Bauman (2003) has found a negative association between the market value of the investor firm and disclosures of liabilities of equity-accounted investees, with the valuation impact being more pronounced in the presence of guarantees than in the absence of guarantees.

In this study, we use a sample of UK firm-years, substantially larger than that used in Bauman's US study and drawn from the six years immediately following the major increase in disclosure requirements brought about by FRS 9, to examine the value relevance to investors in the investor firm of disclosures of liabilities of equity-accounted investees. We also examine whether this differs between associates and joint ventures, and whether it differs between guarantee cases and non-guarantee cases.

3. Research design

The main objective of this study is to examine whether disclosures of the investor-firm share of the liabilities of equity-accounted investees are value-relevant to investors in the investor firm. In order to address this objective, the following regression model is estimated:

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_1 + \beta_{11} \frac{ILD_{it}}{BVA_{i,t-1}} \\ & + \beta_{12} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{13} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{14} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{15} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{1,j} J_{j,it} + \sum_{s=1999}^{2003} \eta_{1,s} Y_{s,it} + e_{1,it}, \end{aligned} \quad (1)$$

⁴ Market value of equity is measured on an ex-dividend basis, in order to be consistent with the balance sheet. The adjustment by the total return on the firm's shares for the three months after the balance sheet date gives a market value measure which (i) reflects information becoming available in the three months following the balance sheet date, and (ii) is consistent with the balance sheet with respect to capital changes that may have occurred in that three-month period.

where: MVE_{it} is the ex-dividend market value of equity of the investor firm i at the balance sheet date t , adjusted by the total return on the firm's shares for the three months after that date;⁴ $BVA_{i,t-1}$ is the book value of assets of firm i at the previous balance sheet date $t-1$, inclusive of its equity-accounted net investment in associates and/or joint

ventures, and is used to scale all variables in the model other than dummy variables; ILD_{it} is the FRS 9-mandated investee-liability disclosure in respect of material associates and all joint ventures, taken together; BVA_{it} is the book value of assets of firm i at the balance sheet date t , inclusive of its equity-accounted net investment; BVL_{it} is the book value of liabilities of firm i at the balance sheet date t , inclusive of any equity-accounted net-liability position recorded within provisions; NI_{it} is the net income of firm i for the period ended at the balance sheet date t ; $LOSS_{it}$ is a dummy variable that takes the value of 1 if firm i reports a loss in the period ended at balance-sheet date t and zero otherwise; $I_{j,it}$ is a dummy variable that takes the value of 1 if firm i is from industry group j and zero otherwise, and allows for differences in the intercept term across five industry groups (see below); $Y_{s,it}$ is a dummy variable that takes the value of 1 if year t is equal to s and zero otherwise, and allows for differences in the intercept term across six years (see below); the α , β , δ and η terms are regression coefficients; and $e_{1,it}$ is a random error term. The first digit in each coefficient subscript refers to the number of the regression model, of which there are four in total (see below).

The explanatory variable of interest is $ILD_{it}/BVA_{i,t-1}$, which is the book-value-scaled investee-liability disclosure for material associates and all joint ventures. ILD_{it} is the amount by which the equity-accounted net investments in the investees for which disclosures are made would have to be grossed up to give the investor-firm share of the gross assets and liabilities of those investees. In the majority of cases for which a disclosure is made, the equity-accounted net investment appears as an asset on the investor firm's balance sheet. In such cases, ILD_{it} comprises the investor-firm share of the total liabilities of the relevant investees. In some cases a disclosure is made where the equity-accounted investor-firm share of investee net liabilities is recorded within provisions by the investor firm. In such cases, ILD_{it} comprises the investor-firm share of the total assets of the relevant investees, equal to the investor-firm share of the total liabilities of the relevant investees less the provi-

sion already recorded by the investor firm in respect of its share of those investees' net liabilities.⁵ ILD_{it} does not reflect liabilities of non-material associates that are not disclosed in the financial statements of the investor firm. In light of the fact that the requirement for UK firms to make investee-liability disclosures was partly motivated by concern that single-line equity accounting was being used as an off-balance-sheet financing device which had the effect of concealing the level of group gearing (ASB, 1996; Crichton, 1996; Johnson and Holgate, 1996), and in light of the US findings of Bauman (2003), we predict that the coefficient on these mandated disclosures is negative ($\beta_{11} < 0$).

The other variables on the right-hand side of model (1) are control variables. We predict a positive coefficient on book value of assets ($\beta_{12} > 0$) and a negative coefficient on book value of liabilities ($\beta_{13} < 0$). The dummy variable for loss cases is included because of the evidence in Hayn (1995) that losses have a lesser impact on firms' market value than profits. β_{14} is the coefficient on net income for profit cases and β_{15} is the coefficient on net income for loss cases less the coefficient on net income for profit cases; we predict $\beta_{14} > 0$ and $\beta_{15} < 0$. The control variables used in model (1) also appear in models (2), (3) and (4) described below, and their predicted signs in these models are as in model (1).

We also estimate two further regression models, each of which is an expansion of model (1), in order to examine the value relevance of different classes of investee-liability disclosure. We test whether there is a difference in the value-relevance regression coefficients (i) between investee-liability disclosures for associates and investee-liability disclosures for joint ventures and (ii) between investee-liability disclosures in the absence of investor-firm guarantees of investee-firm obligations and investee-liability disclosures in the presence of such guarantees. In model (2), investee-liability disclosures are divided into associate and joint venture components. In model (3), they are divided according to whether or not there is an investor-firm guarantee of investee-firm obligations, without distinguishing between associates and joint ventures, as in the model used by Bauman (2003). Models (2) and (3) are as follows:

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_2 + \beta_{21} \frac{ILDA_{it}}{BVA_{i,t-1}} + \beta_{22} \frac{ILDJ_{it}}{BVA_{i,t-1}} \\ & + \beta_{23} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{24} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{25} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{26} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{2,j} I_{j,it} + \sum_{s=1999}^{2003} \eta_{2,s} Y_{s,it} + e_{2,it}, \end{aligned} \quad (2)$$

⁵ It is possible that an equity-accounted net-asset position and an equity-accounted net-liability position, recorded within provisions, might appear within the same balance sheet. This is observed in a small number of cases in our data. In such cases, ILD_{it} comprises both the gross-up of a net-asset position and the gross-up of a net-liability position.

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_3 + \beta_{31} \frac{ILD_{it}}{BVA_{i,t-1}} \cdot N_{it} + \beta_{32} \frac{ILD_{it}}{BVA_{i,t-1}} \cdot G_{it} \\ & + \beta_{33} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{34} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{35} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{36} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{3,j} I_{j,it} + \sum_{s=1999}^{2003} \eta_{3,s} Y_{s,it} + e_{3,it}, \end{aligned} \quad (3)$$

where: $ILDA_{it}$ and $ILDJ_{it}$ are the separate investee-liability disclosures for firm i 's associates and joint ventures, respectively; $N_{it}(G_{it})$ is a dummy variable that takes the value of 1 if there is not (if there is) an investor-firm guarantee of investee-firm obligations and zero otherwise; and other notation is as previously defined. Our use of the dummy variables N_{it} and G_{it} in model (3) is as in the US study by Bauman (2003).

Regression coefficients in models (2) and (3) can be interpreted as follows: β_{21} is the coefficient on associate-liability disclosures; β_{22} is the coefficient on joint venture-liability disclosures; β_{31} is the coefficient on all investee-liability disclosures taken together where there is no investor-firm guarantee; β_{32} is the coefficient on all investee-liability disclosures taken together where there is a guarantee. Consistent with model (1), we predict a negative coefficient on each of the investee-liability disclosures in models (2) and (3) ($\beta_{21} < 0$, $\beta_{22} < 0$, $\beta_{31} < 0$, $\beta_{32} < 0$). Because the creditors of joint ventures might be more likely than those of associates to have explicit or implicit recourse to the assets of the investor firm, we predict that the coefficient on joint venture-liability disclosures is lower (more negative) than the corresponding coefficient on associate-liability disclosures ($\beta_{22} - \beta_{21} < 0$). Also, because of the recourse to the assets of the investor firm conferred by an investor-firm guarantee of investee-firm obligations and in light of the US findings of Bauman (2003), we predict that the coefficient on investee-liability disclosures is lower (more negative) in the presence of such guarantees than in the absence of such guarantees ($\beta_{32} - \beta_{31} < 0$).

Finally, we estimate a fourth model that combines the two dimensions considered in (2) and (3). This allows us to test whether there is a difference in the value-relevance regression coefficients (i) between associate non-guarantee cases and associ-

ate guarantee cases and (ii) between joint venture non-guarantee cases and joint venture guarantee cases. It also allows us to test whether there is a difference in the value-relevance regression coefficients (i) between associate non-guarantee cases and joint venture non-guarantee cases, and (ii) between associate guarantee cases and joint venture guarantee cases. In Model (4) below, AN_{it} (AG_{it}) is a dummy variable that takes the value of 1 if there is not (if there is) an investor-firm guarantee of associate obligations and zero otherwise; JN_{it} (JG_{it}) is a dummy variable that takes the value of 1 if there is not (if there is) an investor-firm guarantee of joint venture obligations and zero otherwise; and other notation is as previously defined.

Regression coefficients in model (4) can be interpreted as follows: β_{41} is the coefficient on associate-liability disclosures where there is no associate guarantee; β_{42} is the coefficient on associate-liability disclosures where there is an associate guarantee; β_{43} is the coefficient on joint venture-liability disclosures where there is no joint venture guarantee; β_{44} is the coefficient on joint venture-liability disclosures where there is a joint venture guarantee. Consistent with models (1), (2) and (3), we predict a negative coefficient on each of the investee-liability disclosures ($\beta_{41} < 0$, $\beta_{42} < 0$, $\beta_{43} < 0$, $\beta_{44} < 0$). Consistent with model (3), we predict that the coefficients on investee-liability disclosures are lower (more negative) in the presence of an investor-firm guarantee than in the absence of such a guarantee ($\beta_{42} - \beta_{41} < 0$, $\beta_{44} - \beta_{43} < 0$). Also, consistent with model (2), we predict that coefficients on joint venture-liability disclosures are lower (more negative) than the corresponding coefficients on associate-liability disclosures ($\beta_{43} - \beta_{41} < 0$, $\beta_{44} - \beta_{42} < 0$).

In light of the possibility that the relative complexity of model (4) might reduce its power to distinguish between guaranteed and non-guaranteed

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_4 + \beta_{41} \frac{ILDA_{it}}{BVA_{i,t-1}} \cdot AN_{it} + \beta_{42} \frac{ILDA_{it}}{BVA_{i,t-1}} \cdot AG_{it} \\ & + \beta_{43} \frac{ILDJ_{it}}{BVA_{i,t-1}} \cdot JN_{it} + \beta_{44} \frac{ILDJ_{it}}{BVA_{i,t-1}} \cdot JG_{it} \\ & + \beta_{45} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{46} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{47} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{48} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{4,j} I_{j,it} + \sum_{s=1999}^{2003} \eta_{4,s} Y_{s,it} + e_{4,it}, \end{aligned} \quad (4)$$

associates and between guaranteed and non-guaranteed joint ventures, we also estimate the model in two restricted forms: (i) including joint venture disclosures, but not associate disclosures; (ii) including associate disclosures, but not joint venture disclosures. The relevant coefficients from these restricted forms of model (4) are very similar to those from the full model (4), and are not reported. The restricted forms of the models are referred to in the account of sensitivity tests given in subsection 5.2 below.

For the purposes of measuring differences between coefficients on different classes of investee-liability disclosure within regression models (2), (3) and (4) as described above, we re-estimate each model in an alternative incremental formulation in which each coefficient relating to investee-liability disclosures is equal to the difference between a pair of investee-liability-disclosure coefficients from the relevant model. The coefficients from these alternative incremental formulations of models (2), (3) and (4), and t-statistics thereon, are reported together with the results for those models.⁶

We also estimate each of models (1) to (4) separately for each of the six years covered by the study, exclusive of the dummy variable relating to the year ($Y_{s,it}$), and report the results from these yearly regression models in summary form.

The overall data set is trimmed of outliers by removing cases for which $MVE_{it}/BVA_{i,t-1}$, $ILD_{it}/BVA_{i,t-1}$, $BVA_{it}/BVA_{i,t-1}$, $BVL_{it}/BVA_{i,t-1}$ and $NI_{it}/BVA_{i,t-1}$ fall in the most extreme 2% of the distribution for that variable. The results from estimating each individual regression model are reported after deleting cases that meet the DFFITS cutoff criterion of Belsey, Kuh and Welsch (1980, p. 28) for that model.⁷

4. Data and descriptive statistics

The data used in this study are drawn from the set of UK listed non-financial firms for which financial statement and market value data are available from Extel and Datastream, respectively, for accounting year-ends from 23 June 1998, the mandatory adoption date for FRS 9, to 31 December 2003. We identify from balance-sheet data and income-statement data provided by Extel those firm-years where there is an investment in an associate and/or a joint venture, including cases where the firm's share of associate and/or joint venture net liabilities is recorded within provisions. For these firm-years, we obtain published financial statements from the Thomson Research database or from the Perfect Information database. From these financial statements, we identify the firm-years for which an FRS 9-mandated investee-liability disclosure is made, and note in each case the aggregate amount of the investee-liability disclosure,

the amount corresponding to associates and the amount corresponding to joint ventures. These amounts are used to construct the investee-liability-disclosure regression variables *ILD*, *ILDA*, and *ILDJ*. (From here on, notation referring to regression variables omits the subscripts and the scaling item.) In order to construct the dummy variables in respect of guarantees (*N*, *G*, *AN*, *AG*, *JN* and *JG*), we also note from the financial statements whether there is an investor-firm guarantee of investee-firm obligations, whether there is a guarantee of associate obligations and whether there is a guarantee of joint venture obligations.⁸ A guarantee is deemed to exist if the investor firm provides a guarantee in respect of an investee firm's liabilities, performance or any of its contractual obligations.⁹ In order to conduct tests of the sensitivity of our results to the use of more restrictive definitions of guarantees, we also note where there is a guarantee specifically in respect of an investee firm's liabilities and, where this is disclosed, we record information that is disclosed with regard to the amount of the guaranteed liabilities. For all firm-years for which an investee-liability disclosure is made, we obtain the following items from Extel (Extel item names in parentheses): book value of assets, denoted *BVA* in regression models (TotalAssets); book value of liabilities, denoted *BVL* in regression models (Debt + Creditors + OtherLiabilities + OtherLTLiabilities + TotalLiabMisc + (DeferredLiabilities – DeferredLiabMinorityInterest)); net income, denoted *NI* in regression models (ProfitAfterTax); creditor for dividends, used to restate the market value of equity to an ex-dividend basis (CreditorsDividendsDue). We also obtain the following items from DATASTREAM: market value of equity (item: *HMV*); return indices, used to adjust the market value of equity by the total return for the three months after the balance sheet date (data type: *RI*). For sensitivity tests referred to below, we also collect from Extel and Datastream the available financial statement and market value data for all firms for which no

⁶ For each of the three models, all results other than those relating to investee-liability disclosures are identical in both the initial formulation and the alternative incremental formulation.

⁷ As indicated below, we test the sensitivity of the results to an alternative treatment of outliers.

⁸ In all but one of the cases in which guarantees of equity-accounted investee-firm obligations are disclosed in the financial statements, it is stated whether they relate to associates, to joint ventures or to both. In the remaining case, it is not specified whether guarantees relate to associates or joint ventures, and we assume that they relate to both classes of investee.

⁹ For accounting periods ending on or after 23 March 1999, the disclosure of guarantees in UK financial statements was required by FRS 12: *Provisions, Contingent Liabilities and Contingent Assets* (ASB, 1998). For earlier accounting periods, it was required by SSAP 18: *Accounting for Contingencies* (ASC, 1980).

Table 1
Profile of sample by year and industry

	Total number of firm-years available	Firm-years with investment in associate or joint venture	Firm-years with FRS 9- mandated associate- and/or joint venture- liability disclosure (used in the study)	Firm-years with gross equity method disclosure for joint venture(s)	Firm-years with materiality disclosure for associate(s)
<i>Classified by year</i>					
1998	825	285	127	108	29
1999	1,254	406	214	182	54
2000	1,286	400	221	197	45
2001	1,315	393	230	207	38
2002	1,304	364	219	200	38
2003	1,227	336	209	184	42
Total	7,211	2,184	1,220	1,078	246
<i>Classified by industry group</i>					
Consumer goods	1,204	340	167	111	56
Industrial	2,048	669	378	349	65
Mineral extraction	359	128	88	80	24
Services	3,497	971	519	472	91
Utilities	103	76	68	66	10
Total	7,211	2,184	1,220	1,078	246
<i>Cases where equity-accounted net-liabilities are recorded</i>					
<i>Guarantees:</i>					
With investor-firm guarantee of investee-firm obligations			184	177	11
With investor-firm guarantee of investee-firm liabilities			232	191	59
			174	146	43

Note: This table summarises the cases used in the study by year and by industry group, and provides information on net-liability cases and guarantee cases. The first column of data reports the numbers of firm-years for which accounting data and market value data for UK non-financial firms are available from Extel and Datastream, respectively, for accounting periods ended from 23 June 1998 (mandatory implementation date of FRS 9) to 31 December 2003. The second column reports the numbers of firm-years for which an equity-accounted investment in an associate and/or joint venture is recorded in the financial statements. The third reports the numbers of cases for which there is an FRS 9-mandated disclosure regarding the underlying asset and liability position of an equity-accounted investment in an associate and/or joint venture. This is the sample used in the study. The fourth and fifth columns report, respectively, the numbers of cases of those summarised in the previous column for which there is (i) a gross equity method disclosure regarding a joint venture and (ii) an associate materiality disclosure. We do not distinguish between 15% and 25% materiality disclosures. We also report for each FRS 9 disclosure category the numbers of firm-years for which an equity-accounted net liability is recorded within provisions. Under the heading of 'Guarantees', we report in the first row the numbers of firm-years in each FRS 9 disclosure category for which there are (i) an associate- and/or joint venture-liability disclosure and a guarantee of associate and/or joint venture obligations, (ii) a gross equity method joint venture disclosure and a guarantee of joint venture obligations, and (iii) an associate materiality disclosure and a guarantee of associate obligations. In the second row, we report corresponding figures for guarantees in respect of investee liabilities.

investee-liability disclosure is made.

Table 1 shows the breakdown of our data set by year, broad industry group and class of FRS 9-mandated investee-liability disclosure. The year and industry-group breakdowns correspond with the year and industry-group dummy variables included in regression models (1) to (4). There are 7,211 firm-years for which accounting and market value data are available from Extel and Datastream. In 2,184 of these firm-years (30% of 7,211), there are associate and/or joint venture investments. It is notable that the proportion of firms with investments in associates and/or joint ventures is particularly high in the utilities industry group.¹⁰ In 1,220 of the 2,184 firm-years (56% of 2,184), there is an FRS 9-mandated associate-and/or joint venture-liability disclosure. Within the 1,220 FRS 9 investee-liability disclosures, there are 1,078 cases with joint venture gross equity method disclosures (88% of 1,220) and 246 cases with associate materiality disclosures (20%). We do not distinguish between 15% and 25% materiality disclosures. The table also reports for each FRS 9 disclosure category, the numbers of cases for which an equity-accounted net liability is reported within the investor firm's provisions. Of the 1,220 cases for which there is an associate- and/or joint venture-liability disclosure, there are 184 such cases (15%); of the 1,078 cases for which there is a joint venture gross equity method disclosure, there are 177 such cases (16%); of the 246 cases for which there is an associate materiality disclosure, there are 11 such cases (4%). The final two rows of the table report, respectively, the number of firm-years in each disclosure category for which there is an investor-firm guarantee of investee-firm obligations and, relevant to a sensitivity test referred to below, the number of firm-years in each disclosure category for which there is an investor-firm guarantee of investee-firm liabilities. Of the 1,220 cases for which there is an associate-and/or joint venture-liability disclosure, there are 232 cases (19%) where there is a guarantee of associate and/or joint venture obligations; of the 1,078 cases for which there is a joint venture gross equity method disclosure, there are 191 cases where there is a guarantee of joint venture obligations (18%); of the 246 cases for which there is an associate materiality disclosure, there are 59 cases where there is a guarantee of associate obligations (24%). The corresponding figures for liability guarantees are 174 (14%), 146 (14%) and 43 (17%), respectively.

Table 2 gives descriptive statistics for regression variables prior to outlier deletion, including non-zero cases of associate disclosures (ILDAs) and non-zero cases of joint venture disclosures (ILDJs), both unscaled and scaled by lagged book value of assets. The means for associate disclosures are higher than those for joint venture disclosures, which is understandable in light of the fact that FRS 9 required disclosure of investee liabilities for all joint ventures, but only required disclosure for associates if they were material. The statistics for the scaled data reveal the existence of some extreme cases that suggest the need for the outlier deletion referred to above. It is notable that some large losses cause the mean of scaled net income to be negative. Also, the median of book-value-scaled net income is only 4%, reflecting the relatively high proportion of loss cases in the period covered by the study.¹¹ Table 3 gives correlation coefficients between scaled variables used in regression model (1). These statistics are for the data after deletion of outliers, which reduces the data set from 1,220 cases to 1,167 cases. It is notable that the correlation between market value of equity and investee-liability disclosures overall is very close to zero (-0.01), and that the correlation between ILDAs and ILDJs is low (-0.12).

5. Results

5.1. Results from regression models (1), (2), (3) and (4)

Table 4 reports the results of estimating regression models (1), (2), (3) and (4). The first column lists the explanatory variables for the regression models, excluding the year and industry-group dummy variables, the second column gives the predicted signs of the regression coefficients, and the remaining four columns report the regression coefficients and related information for each of the four regression models. The table also reports results from the alternative incremental formulations of each of models (2), (3) and (4), which give the differences between pairs of regression coefficients on different classes of investee-liability disclosure. In each case, the difference reported is equal to the coefficient on the first-named regression variable less the coefficient on the second-named regression variable. Beneath each coefficient in Table 4, we report the t -statistic and the result of a significance test on the coefficient. For all coefficients, other than intercept terms, and for all differences between coefficients, significance tests are one-tailed. For the intercept terms, significance tests are two-tailed. For all regression coefficients, other than intercept terms, we also report the number of years out of six for which the coefficient is of the predicted sign and the number of years out of six for which it is of the predicted sign and significantly different from zero at the 5% level.

¹⁰ Outlier deletion did not result in significant variation from the distribution across time, industry group and disclosure category reported in Table 1.

¹¹ A loss is reported in about 38% of the 7,211 firm-years from which the data set is drawn, and in about 26% of the firm-years used in the study.

Table 2
Descriptive statistics for regression variables

	<i>Number of cases</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>25th percentile</i>	<i>50th percentile</i>	<i>75th percentile</i>	<i>Maximum</i>
<i>Variables expressed in £m:</i>								
<i>MVE</i>	1,220	2,670.57	11,171.72	0.22	47.05	217.55	1,164.32	187,287.79
<i>ILD</i>	1,220	218.64	810.34	<0.01	1.32	10.23	91.80	10,042.00
<i>ILDA</i> (non-zero cases only)	246	398.71	1,370.80	<0.01	3.89	20.00	156.00	9,954.00
<i>ILDJ</i> (non-zero cases only)	1,078	156.46	520.67	<0.01	1.20	8.35	86.00	6,212.00
<i>BVA</i>	1,220	2,917.31	11,758.48	0.30	73.57	314.44	1,746.95	172,390.00
<i>BVL</i>	1,220	1,536.77	4,603.55	0.10	33.44	199.90	1,131.95	55,331.39
<i>NI</i>	1,220	62.36	794.95	-15,679.00	-0.33	9.16	50.70	8,007.77
<i>Variables expressed as a proportion of beginning-of-period total assets:</i>								
<i>MVE</i>	1,220	2.98	45.59	0.01	0.39	0.69	1.40	1,586.89
<i>ILD</i>	1,220	0.19	2.07	<0.01	0.01	0.04	0.12	71.53
<i>ILDA</i> (non-zero cases only)	246	0.44	4.56	<0.01	0.04	0.07	0.15	71.53
<i>ILDJ</i> (non-zero cases only)	1,078	0.11	0.27	<0.01	0.01	0.03	0.10	5.06
<i>BVA</i>	1,220	1.42	3.42	0.04	0.96	1.06	1.21	85.55
<i>BVL</i>	1,220	0.70	0.75	0.02	0.47	0.61	0.78	13.05
<i>NI</i>	1,220	-0.03	0.57	-9.39	<0.01	0.04	0.08	5.25

Notes:

1. This table reports descriptive statistics in £m and as a proportion of previous-period assets, before deletion of outliers, for the 1,220 cases for which there is an investee-liability disclosure (see Table 1).
2. The notation used in the table is as follows:
 - MVE* is the ex-dividend market value of equity of the investor firm at its balance sheet date, adjusted by the total return on the firm's shares for the three months after that date;
 - ILD* is the FRS 9-mandated investee-liability disclosure in respect of material associates and all joint ventures, taken together;
 - ILDA* is the investee-liability disclosure for associates;
 - ILDJ* is the investee-liability disclosure for joint ventures;
 - BVA* is the book value of assets at the firm's balance sheet date, inclusive of its equity-accounted net investment in associates and/or joint ventures;
 - BVL* is the book value of liabilities at the firm's balance sheet date, inclusive of any equity-accounted net-liability position recorded within provisions;
 - NI* is the net income of the firm for the accounting period ended at the balance sheet date.

Table 3
Pearson correlation coefficients for regression variables

	<i>MVE</i>	<i>ILD</i>	<i>ILDA</i>	<i>ILDJ</i>	<i>BVA</i>	<i>BVL</i>	<i>NI</i>
<i>MVE</i>	1.00						
<i>ILD</i>	-0.01	1.00					
<i>ILDA</i>	0.02	N/A	1.00				
<i>ILDJ</i>	-0.02	N/A	-0.12	1.00			
<i>BVA</i>	0.50	0.05	0.00	0.05	1.00		
<i>BVL</i>	0.18	0.14	-0.04	0.18	0.52	1.00	
<i>NI</i>	-0.17	0.08	0.06	0.05	0.02	0.11	1.00

Number of cases: 1,167

Note:

This table reports the Pearson correlation coefficients for the following regression variables, scaled by previous-period assets and after outlier deletion as described in the text:

MVE is the ex-dividend market value of equity of the investor firm at its balance sheet date, adjusted by the total return on the firm's shares for the three months after that date;

ILD is the FRS 9-mandated investee-liability disclosure in respect of material associates and all joint ventures, taken together;

ILDA is the investee-liability disclosure for associates;

ILDJ is the investee-liability disclosure for joint ventures;

BVA is the book value of assets at the firm's balance sheet date, inclusive of its equity-accounted net investment in associates and/or joint ventures;

BVL is the book value of liabilities at the firm's balance sheet date, inclusive of any equity-accounted net-liability position recorded within provisions;

NI is the net income of the firm for the accounting period ended at the balance sheet date.

For all four models, all control variables (*BVA*, *BVL*, *NI* and *NI-LOSS*) are of the predicted sign and significantly different from zero at the 1% level, *BVA*, *NI* and *NI-LOSS* are each of the predicted sign and significant in all six years, and *BVL* is of the predicted sign in four years and significant in one year.

Model (1) examines the value relevance of investee-liability disclosures (*ILDs*), without distinguishing between associate and joint venture cases and without distinguishing between guarantee and non-guarantee cases. The coefficient on the *ILD* is of the predicted negative sign and is significant. When the model is estimated separately for each of the six years from 1998 to 2003, the coefficient is of the predicted sign in all six years, although it is significant in only two years. The result suggests that FRS 9-mandated disclosures, which facilitated the grossing up of equity-accounted net investments in associates and joint ventures to reflect the investor-firm share of the liabilities of those investees, gave investors a negative signal consistent with the concerns about concealment of off-balance-sheet financing reflected in ASB (1994), ASB (1996), Bierman (1992), Crichton (1996), Johnson and Holgate (1996) and Milburn and Chant (1999). This finding is consistent with the US finding of Bauman (2003).

Model (2) shows whether the regression coefficient on investee-liability disclosures is lower

(more negative) for joint ventures, over which the investor firm exercises joint control (regression variable: *ILDJ*), than for associates, over which it merely exercises significant influence (regression variable: *ILDA*). The coefficients on associate disclosures and on joint venture disclosures are each of the predicted negative sign; the coefficient on joint venture disclosures is significant whilst that for associate disclosures is not. When model (2) is estimated separately for each year, the coefficients on associate and joint venture disclosures are each of the predicted negative sign in five of the six years, the coefficient on associate disclosures is never significant, and the coefficient on joint venture disclosures is significant in only one year. In that the coefficient for joint ventures is significant whilst that for associates is not, the overall six-year findings are consistent with our prediction that the negative impact of joint venture disclosures is stronger than that of associate disclosures. However, the coefficient for joint ventures is higher (less negative) than that for associates, and in the yearly regression models the difference between the coefficients is of the predicted sign in only two of the six years, and is never significant.

Model (3) shows whether the regression coefficient on investee-liability disclosures is lower (more negative) in the presence of investor-firm guarantees of investee-firm obligations (regression variable: *ILD-G*) than in the absence of such guar-

Table 4
Regression results

<i>Regression variable (scaling item and subscripts are suppressed in notation)</i>	<i>Predicted sign</i>	<i>Model (1) Coefficients (t-statistics) [years: note 3]</i>	<i>Model (2) Coefficients (t-statistics) [years: note 3]</i>	<i>Model (3) Coefficients (t-statistics) [years: note 3]</i>	<i>Model (4) Coefficients (t-statistics) [years: note 3]</i>
Intercept	?	-1.06 (-7.46)**	-1.04 (-7.52)**	-1.04 (-7.37)**	-0.99 (-6.86)**
<i>ILD</i>	Negative	-0.34 (-2.06)* [6; 2]			
<i>ILDA</i>	Negative		-0.56 (-1.43) [5; 0]		
<i>ILDJ</i>	Negative		-0.33 (-2.07)* [5; 1]		
<i>ILD-N</i>	Negative			-0.34 (-1.86)* [5; 1]	
<i>ILD-G</i>	Negative			-0.37 (-1.47) [5; 0]	
<i>ILDA-AN</i>	Negative				-1.33 (-4.04)** [5; 3]
<i>ILDA-AG</i>	Negative				0.37 (0.65) [3; 0]
<i>ILDJ-JN</i>	Negative				-0.23 (-1.21) [5; 0]
<i>ILDJ-JG</i>	Negative				-0.73 (-3.01)** [6; 0]
<i>BVA</i>	Positive	1.50 (9.52)** [6; 6]	1.53 (10.03)** [6; 6]	1.50 (9.38)** [6; 6]	1.46 (8.66)** [6; 6]
<i>BVL</i>	Negative	-0.33 (-2.44)** [4; 1]	-0.37 (-2.70)** [4; 1]	-0.36 (-2.57)** [4; 1]	-0.35 (-2.49)** [4; 1]
<i>NI</i>	Positive	7.82 (10.53)** [6; 6]	7.76 (10.54)** [6; 6]	7.87 (10.62)** [6; 6]	7.96 (9.78)** [6; 6]
<i>NI-LOSS</i>	Negative	-10.48 (-10.57)** [6; 6]	-10.37 (-10.63)** [6; 6]	-10.47 (-10.72)** [6; 6]	-10.75 (-10.53)** [6; 6]

Table 4
Regression results (continued)

Regression variable (scaling item and subscripts are suppressed in notation)	Predicted sign	Model (1) Coefficients (t-statistics) [years: note 3]	Model (2) Coefficients (t-statistics) [years: note 3]	Model (3) Coefficients (t-statistics) [years: note 3]	Model (4) Coefficients (t-statistics) [years: note 3]
<i>Differences (note 2):</i>					
ILDJ less ILDA	Negative		0.23 (0.57) [2; 0]		
ILD·G less ILD·N	Negative			-0.03 (0.12) [4; 0]	
ILDA·AG less ILDA·AN	Negative				1.70 (2.70) [1; 0]
ILDJ·JG less ILDJ·JN	Negative				-0.50 (-1.90)* [5; 0]
ILDJ·JN less ILDA·AN	Negative				1.10 (3.04) [1; 0]
ILDJ·JG less ILDA·AG	Negative				-1.10 (-1.72)* [5; 1]
Adjusted R-squared		50.6%	50.8%	50.0%	48.5%
Number of cases		1,167	1,167	1,167	1,167

Notes:

1. Regression models are as follows:

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_1 + \beta_{11} \frac{ILD_{it}}{BVA_{i,t-1}} \\ & + \beta_{12} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{13} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{14} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{15} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{1,j} I_{j,it} + \sum_{s=1999}^{2003} \eta_{1,s} Y_{s,it} + e_{1,it} \end{aligned} \quad (1)$$

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_2 + \beta_{21} \frac{ILDA_{it}}{BVA_{i,t-1}} + \beta_{22} \frac{ILDJ_{it}}{BVA_{i,t-1}} \\ & + \beta_{23} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{24} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{25} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{26} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{2,j} I_{j,it} + \sum_{s=1999}^{2003} \eta_{2,s} Y_{s,it} + e_{2,it} \end{aligned} \quad (2)$$

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_3 + \beta_{31} \frac{ILD_{it}}{BVA_{i,t-1}} \cdot N_{it} + \beta_{32} \frac{ILD_{it}}{BVA_{i,t-1}} \cdot G_{it} \\ & + \beta_{33} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{34} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{35} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{36} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{3,j} I_{j,it} + \sum_{s=1999}^{2003} \eta_{3,s} Y_{s,it} + e_{3,it} \end{aligned} \quad (3)$$

Table 4
Regression results (*continued*)

$$\begin{aligned} \frac{MVE_{it}}{BVA_{i,t-1}} = & \alpha_4 + \beta_{41} \frac{ILDA_{it}}{BVA_{i,t-1}} \cdot AN_{it} + \beta_{42} \frac{ILDA_{it}}{BVA_{i,t-1}} \cdot AG_{it} \\ & + \beta_{43} \frac{ILDJ_{it}}{BVA_{i,t-1}} \cdot JN_{it} + \beta_{44} \frac{ILDJ_{it}}{BVA_{i,t-1}} \cdot JG_{it} \\ & + \beta_{45} \frac{BVA_{it}}{BVA_{i,t-1}} + \beta_{46} \frac{BVL_{it}}{BVA_{i,t-1}} + \beta_{47} \frac{NI_{it}}{BVA_{i,t-1}} + \beta_{48} \frac{NI_{it}}{BVA_{i,t-1}} \cdot LOSS_{it} \\ & + \sum_{j=2}^5 \delta_{4,j} I_{j,it} + \sum_{s=1999}^{2003} \eta_{4,s} Y_{s,it} + e_{4,it} \end{aligned} \quad (4)$$

where:

- MVE_{it} is the ex-dividend market value of equity of the investor firm i at the balance sheet date t , adjusted by the total return on the firm's shares for the three months after that date;
- $BVA_{i,t-1}$ is the book value of assets of firm i at the previous balance sheet date $t-1$, inclusive of the equity-accounted net investment in associates and/or joint ventures, and is used to scale all variables in the model other than dummy variables;
- $ILDA_{it}$ is the FRS 9-mandated investee-liability disclosure of the investor firm i at the balance sheet date t in respect of material associates and all joint ventures, taken together;
- $ILDJ_{it}$ and AN_{it} (AG_{it}) are the investee-liability disclosures for associates and joint ventures, respectively;
- N_{it} (G_{it}) is a dummy variable that takes the value of 1 if there is not (if there is) an investor-firm guarantee of investee-firm obligations, and zero otherwise;
- AN_{it} (AG_{it}) is a dummy variable that takes the value of 1 if there is not (if there is) an investor-firm guarantee of associate obligations, and zero otherwise;
- JN_{it} (JG_{it}) is a dummy variable that takes the value of 1 if there is not (if there is) an investor-firm guarantee of joint venture obligations, and zero otherwise;
- BVA_{it} is the book value of assets of firm i at the balance sheet date t , inclusive of the equity-accounted net investment;
- BVL_{it} is the book value of liabilities of firm i at the balance sheet date t , inclusive of any equity-accounted net-liability position recorded within provisions;
- NI_{it} is the net income of firm i for the period ended at the balance sheet date t ;
- $LOSS_{it}$ is a dummy variable that takes the value of 1 if firm i reports a loss in the period ended at balance-sheet date t , and zero otherwise;
- $I_{j,it}$ is a dummy variable that takes the value of 1 if firm i is from industry group j , and zero otherwise;
- $Y_{s,it}$ is a dummy variable that takes the value of 1 if $t = s$, and zero otherwise;
- the α , β , δ , and η terms are regression coefficients;
- the e terms are random error terms.

- For each regression variable, the table reports (i) the coefficient estimated from the overall six-year data set from 1998 to 2003, (ii) the t -statistic thereon (in parentheses), (iii) the result of a significance test on the coefficient, where * (**) indicates that the coefficient is significantly different from zero at the 5% (1%) level and (iv) except for intercept coefficients, information on regression coefficients for models estimated separately for each year [in square parentheses]. See note 3 for details of the information reported in respect of yearly regression coefficients. Under the heading of 'Differences', the table reports coefficients and related statistics from alternative incremental formulations of models (2), (3) and (4), where each coefficient relating to investee-liability disclosures is equal to the difference between a pair of investee-liability-disclosure coefficients reported above. For each of the alternative incremental formulations of models (2), (3) and (4), all other coefficients (and t -statistics thereon) are identical to those reported above, and are not separately reported. All t -statistics are calculated using the heteroskedasticity-consistent covariance matrix estimator (White, 1980). For the intercept terms, significance tests are two-tailed. For all other coefficients, including those from the alternative incremental formulations of models (2), (3) and (4), significance tests are one-tailed, with the predicted sign of each coefficient being given in the second column of the table.
- The pairs of figures reported in square parentheses relate to the coefficients estimated when regression models are estimated separately for each of the six years from 1998 to 2003. The first figure of each pair indicates the number of years out of six for which the coefficient is of the predicted sign; the second figure of each pair indicates the number of years out of six for which the coefficient is of the predicted sign and significantly different from zero at the 5% level.

antees (regression variable: *ILD·N*). Consistent with models (1) and (2), both coefficients are of the predicted negative sign; the coefficient for non-guarantee cases is significant, whilst that for guarantee cases is not. When model (3) is estimated separately for each year, the coefficients for each class are each of the predicted negative sign in five of the six years, the coefficient for non-guarantee cases is significant in only one year, and the coefficient for guarantee cases is never significant. Although the coefficient for guarantee cases is, as predicted, lower (more negative) than that for non-guarantee cases, the difference between coefficients is not significant. In the yearly regression models, the difference between coefficients is of the predicted sign in four out of six years, but is never significant. The lack of evidence in our results that the negative valuation impact of investee-liability disclosures is more pronounced in the presence of investor-firm guarantees contrasts with the conclusion of the US study by Bauman (2003).

Model (4) combines the two dimensions considered separately in models (2) and (3), in that it compares coefficients for investee-liability disclosures in respect of the following four cases: associate cases in the absence of associate guarantees (regression variable: *ILDA·AN*); associate cases in the presence of associate guarantees (regression variable: *ILDA·AG*); joint venture cases in the absence of joint venture guarantees (regression variable: *ILDJ·JN*); joint venture cases in the presence of joint venture guarantees (regression variable: *ILDJ·JG*). The coefficients for associate non-guarantee cases and for joint venture guarantee cases are of the predicted negative sign and are significant; the coefficient for joint venture non-guarantee cases is of the predicted negative sign, but is not significant; the coefficient for associate guarantee cases is positive, but would not be significantly different from zero in a two-tailed hypothesis test. With the exception of the coefficient for associate guarantee cases, these results are consistent with those for models (2) and (3) with regard to the negative sign of the coefficients on investee-liability disclosures. When model (4) is estimated separately for each year, the coefficients on investee-liability disclosures are of the predicted negative sign in three years for associate guarantee cases, and in

five or six years for the other three classes, but only in the case of associate non-guarantee disclosures are any of the yearly regression coefficients significant (three out of six). With regard to differences between coefficients, two of our predictions are supported by the results. The coefficient for joint venture guarantee cases is more negative than that for joint venture non-guarantee cases, and the difference is significant; also, the coefficient for joint venture guarantee cases is more negative than that for associate guarantee cases, and the difference is significant. In both cases, the difference between coefficients is of the predicted sign in five out of six years; the difference between coefficients for joint venture guarantee cases and joint venture non-guarantee cases is not significant in any year; the difference between coefficients for joint venture guarantee cases and associate guarantee cases is significant in one year only. Our prediction regarding the difference between the coefficients for associate guarantee cases and associate non-guarantee cases and our prediction regarding the difference between the coefficients for joint venture non-guarantee cases and associate non-guarantee cases are not supported: both differences are opposite to the predicted sign, and would be significantly different from zero in a two-tailed hypothesis test.

5.2. Sensitivity tests

We test the sensitivity of our results to a number of alternative procedures.

First, we test the sensitivity of our results to alternative methods for distinguishing between guarantee cases and non-guarantee cases. For this purpose, we repeat our analysis using data in which guarantee-related dummy variables are defined by reference to guarantees of liabilities, rather than by reference to guarantees of the broader category of 'obligations'. We also repeat our analysis using data in which investee-liability disclosures are divided into (i) amounts that we can identify from notes to the financial statements as likely to be viewed by readers as guaranteed by the investor firm (classified as 'guaranteed') and (ii) other amounts (classified as 'non-guaranteed'). Furthermore, we allow for the possibility that recognition within the investor firm's provisions of a negative (net-liability) equity-accounted investment might be interpreted as signalling the existence of an implicit guarantee of the investee's obligations. In order to do this, we repeat our analysis using data in which investee-liability disclosures in respect of all net-liability investees are treated as guaranteed, regardless of whether a guarantee is explicitly mentioned in the financial statements of the investor firm.¹²

Second, because comparability of the value relevance of associate-liability disclosures and joint venture-liability disclosures might be reduced due

¹² This treatment of disclosures in respect of net-liability investees that are reflected within provisions will tend to overstate the extent of implicit guarantees under FRS 9. FRS 9 required that equity-accounted net liabilities should only be omitted from the investor firm's balance sheet if the investor firm had irreversibly withdrawn from its relationship with the investee (ASB, 1997, paragraphs 44–45). If the provisions had been recorded under IAS 28, the treatment in our sensitivity test would be clearly justified, since IAS 28 requires that net-liability cases should only appear on the investor firm's balance sheet if the investor firm has entered into an obligation with respect to the investee (IASB, 2003a, paragraphs 29–30).

to the fact that FRS 9 required disclosures for all joint ventures but only for material associates, the analysis is repeated using only those disclosures that relate to material associates and material joint ventures.

Third, the analysis is repeated using only those cases for which there is both an associate disclosure and a joint venture disclosure.

Fourth, the analysis is repeated including (i) all cases for which there is an associate and/or joint venture investment, regardless of whether an investee-liability disclosure is made, and (ii) all cases for which accounting and market value data are available from Extel and Datastream, respectively, regardless of whether there is an equity-accounted investment.

Fifth, as mentioned earlier, in light of the relatively complex nature of model (4), the model is estimated in two restricted forms: (i) including joint venture disclosures, but not associate disclosures; (ii) including associate disclosures, but not joint venture disclosures.

Finally, the analysis is repeated after deleting as outliers 1% of extreme cases, instead of 2% of cases.

None of these alternative procedures gives results that differ materially from those reported in Table 4.

5.3. Summary of results

Overall, our results suggest that FRS9-mandated investee-liability disclosures had a negative valuation impact. The value-relevance regression coefficient on all investee-liability disclosures taken together is negative and significant. Seven of the eight value-relevance regression coefficients for particular classes of investee-liability disclosures are negative, although only four of these are significant. The negative sign of the coefficients on investee-liability disclosures is consistent with the US findings of Bauman (2003). Contrary to our predictions, we do not find convincing evidence that joint venture disclosures overall have a stronger negative valuation impact than associate disclosures overall or that disclosures in guarantee cases overall have a stronger negative valuation impact than disclosures in non-guarantee cases overall. However, consistent with our predictions, we do find evidence that disclosures for joint venture guarantee cases have stronger negative value relevance than those for joint venture non-guarantee cases and those for associate guarantee cases. Our results should be viewed in light of the fact that, although our yearly value-relevance regression coefficients on investee-liability disclosures are of negative sign in 83% of cases (45 out of 54), they are significant in only 13% of cases (7 out of 54), but the weaker results from our yearly regression models may be due in part to the relatively

small sample sizes available for individual years.

A feature of our results is the lack of convincing evidence of a difference between the value relevance of investee-liability disclosures for joint ventures and those for associates. This could indicate that there is limited economic difference between joint ventures and associates, at least with regard to information on investee indebtedness disclosed in financial statements. We should also bear in mind the possibility that the distinction between the two types of investee entity may have been blurred because investor firms may have structured investments as associates rather than as joint ventures in order to avoid increased disclosure. This issue is not addressed in this study. However, the question of whether the existence of different accounting and disclosure requirements for different classes of investee may have influenced managers' choices with regard to how investments are structured would be a worthwhile subject for further research.

6. Conclusion

The issues of whether and how to reflect in investor-firm financial statements information about the liabilities of equity-accounted investees have given rise to some debate and to some differences in practice across GAAP regimes. This study examines the value relevance of disclosures mandated by the UK accounting standard FRS 9: *Associates and Joint Ventures* (ASB, 1997) regarding the investor-firm share of liabilities of equity-accounted associates and joint ventures. FRS 9 defined for the first time strict thresholds governing such disclosure by UK investor firms, and brought about a significant increase in disclosure. In light of the concerns about concealment of group gearing that partly motivated the investee-liability disclosure requirements of FRS 9, and the findings of previous US research, we predict that the mandated disclosures are negatively associated with the market value of equity of the investor firm. In light of the distinction that FRS 9 drew between joint ventures and associates because the former are subject to the investor firm's joint control whereas the latter are merely subject to its significant influence, and the possibility that the creditors of joint ventures might be more likely than those of associates to have explicit or implicit recourse to the assets of the investor firm, the study also examines whether the negative valuation impact of investee-liability disclosures is more pronounced for joint ventures than for associates. In light of findings of previous US research, it also examines whether the negative valuation impact of investee-liability disclosures is more pronounced in the presence of investor-firm guarantees of investee-firm obligations than in the absence of such guarantees.

Subject to caveats regarding the significance of results from yearly regression models, our results confirm the prior US finding of Bauman (2003) regarding the negative valuation impact of disclosures of the liabilities of equity-accounted investees. From the perspective of the accounting regulator, this evidence provides some confirmation of the value to investors of disclosures about liabilities of equity-accounted investees, and suggests that such disclosures are seen as negative signals, consistent with the concerns about off-balance-sheet financing that partly motivated the requirements for such disclosures. These results are supportive of revisions made to IAS 28: *Investments in Associates* (IASB, 2003a), which post-dated FRS 9 and which have required disclosure of associate liabilities for accounting periods beginning on or after 1 January 2005.

Our results relating to the distinction between joint ventures and associates have some relevance in light of the proposed revision of IAS 31: *Interests in Joint Ventures* (IASB, 2003b), which would eliminate the use of proportionate consolidation and require that joint ventures be accounted for by the equity method, as is required for associates. There is some evidence in our study that the value-relevance of investee-liability disclosures is more pronounced for guaranteed joint venture liabilities than for guaranteed associate liabilities. However, the lack of overall evidence of a difference between the value relevance of investee-liability disclosures for joint ventures and those for associates could indicate that there is limited economic difference between joint ventures and associates, at least with regard to information on investee indebtedness disclosed in financial statements, and we would not claim to report strong evidence of the need for different treatments for joint venture liabilities and associate liabilities. In any event, provided that the liabilities of equity-accounted joint ventures are required to be disclosed by way of note, separately from those of associates, the removal of the proportionate consolidation option in international GAAP would not significantly reduce the quality of information regarding the liabilities of joint ventures.

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Twenty-five years of the Taffler z-score model: does it really have predictive ability?

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Abstract—Although copious statistical failure prediction models are described in the literature, appropriate tests of whether such methodologies really work in practice are lacking. Validation exercises typically use small samples of non-failed firms and are not true tests of *ex ante* predictive ability, the key issue of relevance to model users. This paper provides the operating characteristics of the well-known Taffler (1983) UK-based z-score model for the first time and evaluates its performance over the 25-year period since it was originally developed. The model is shown to have clear predictive ability over this extended time period and dominates more naïve prediction approaches. This study also illustrates the economic value to a bank of using such methodologies for default risk assessment purposes. *Prima facie*, such results also demonstrate the predictive ability of the published accounting numbers and associated financial ratios used in the z-score model calculation.

Keywords: z-scores; bankruptcy prediction; financial ratios; type I and type II errors; economic value

1. Introduction

There is renewed interest in credit risk assessment methods following Basel II and recent high profile failures such as Enron and Worldcom. New approaches are continuously being proposed (e.g. Hillegeist et al., 2004; Vassalou and Xing, 2004; Bharath and Shumway, 2004) and academic journals publish special issues on the topic (e.g. *Journal of Banking and Finance*, 2001). The traditional z-score technique for measuring corporate financial distress, however, is still a well-accepted tool for practical financial analysis. It is discussed in detail in most of the standard texts and continues to be widely used both in academic literature and by practitioners.

The z-score is used as a proxy for bankruptcy risk in exploring such areas as merger and divestment activity (e.g. Shrieves and Stevens, 1979; Lasfer et al., 1996; Sudarsanam and Lai, 2001), asset pricing and market efficiency (e.g. Altman and Brenner, 1981; Katz et al., 1985; Dichev, 1998; Griffin and Lemmon, 2002; Ferguson and

Shockley, 2003), capital structure determination (e.g. Wald, 1999; Graham, 2000; Allayannis et al., 2003; Molina, 2005), the pricing of credit risk (see Kao, 2000 for an overview), distressed securities (e.g. Altman, 2002: ch. 22; Marchesini et al., 2004), and bond ratings and portfolios (e.g. Altman, 1993: ch. 10; Caouette et al., 1998: ch. 19). Z-score models are also extensively used as a tool in assessing firm financial health in going-concern research (e.g. Citron and Taffler, 1992, 2001 and 2004; Carcello et al., 1995; Mutchler et al., 1997; Louwers, 1998; Taffler et al., 2004).

Interestingly, despite the widespread use of the z-score approach, no study to our knowledge has properly sought to test its predictive ability in the almost 40 years since Altman's (1968) seminal paper was published. The recent paper by Balcaen and Ooghe (2006), which raises a range of important theoretical issues relating to the model development process including the definition of failure, problems of ratio instability, sampling bias and choice of statistical method, only serves to demonstrate the need to conduct such empirical tests. The existing literature that seeks to do this, at best, typically uses samples of failed and non-failed firms (e.g. Begley et al., 1996), rather than testing the respective models on the underlying population. This, of course, does not provide a true test of *ex ante* forecasting ability as the key issue of type II error rates (predicting non-failed as failed) is not addressed.¹

This paper seeks to fill this important gap in the literature by specifically exploring the question of

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¹ The only possible exception is the recent paper of Beaver et al. (2005) for US data. However, their out-of-sample testing is for a much shorter period than this study, and their focus is not on the predictive ability of published operational models.

whether a well-established and widely-used UK-based z-score model driven by historic accounting data has true *ex ante* predictive ability over the 25 years since it was originally developed.

The remainder of the paper is structured as follows. Section 2 provides a brief overview of conventional z-score methodology and describes the UK-based model originally published in this journal (see Taffler, 1983), including the provision of the actual model coefficients for the first time, which is the subject of our analysis. Section 3 provides our empirical results and tests whether this z-score model really does capture risk of corporate failure. Section 4 reviews issues relating to the temporal stability of z-score models and Section 5 discusses common misperceptions relating to what such models are and are not. The final section, Section 6, provides some concluding reflections.

2. The z-score model

The generic z-score is the distillation into a single measure of a number of appropriately chosen financial ratios, weighted and added. If the derived z-score is above a cut-off, the firm is classified as financially healthy, if below the cut-off, it is viewed as a potential failure.

This multivariate approach to failure prediction was first published almost 40 years ago with the eponymous Altman (1968) z-score model in the US, and there is an enormous volume of studies applying related approaches to the analysis of corporate failure internationally.² This paper reviews the track record of a well-known UK-based z-score model for analysing the financial health of firms listed on the London Stock Exchange which was originally developed in 1977; a full description is provided in *Accounting and Business Research* volume 15, no. 52 (Taffler, 1983). The model itself was originally developed to analyse industrial (manufacturing and construction) firms only with separate models developed for retail and service enterprises.³ However, we apply it across all non-financial listed firms in the performance tests below.⁴

As explained in Taffler (1983), the first stage in building this model was to compute over 80 carefully selected ratios from the accounts of all listed industrial firms failing between 1968 and 1976 and 46 randomly selected solvent industrial firms.⁵ Then using, *inter alia*, stepwise linear discriminant analysis, the z-score model was derived by determining the best set of ratios which, when taken together and appropriately weighted, distinguished optimally between the two samples.⁶

If a z-score model is correctly developed its component ratios typically reflect certain key dimensions of corporate solvency and performance.⁷ The power of such a model results from the appropriate integration of these distinct dimensions

weighted to form a single performance measure, using the principle of the whole being worth more than the sum of the parts.

Table 1 provides the Taffler (1983) model's ratio definitions and coefficients. It also indicates the four key dimensions of the firm's financial profile that are being measured by the selected ratios. These dimensions, identified by factor analysis, are: profitability, working capital position, financial risk and liquidity. The relative contribution of each to the overall discriminant power of the model is measured using the Mosteller-Wallace criterion. Profitability accounts for around 50% of the discriminant power of the model and the three balance sheet measures together account for a similar proportion.

In the case of this model, if the computed z-score is positive, i.e. above the 'solvency threshold' on the 'solvency thermometer' of figure 1, the firm is solvent and is very unlikely indeed to fail within the next year. However, if its z-score is negative, it lies in the 'at risk' region and the firm has a financial profile similar to previously failed businesses and, depending on how negative, a high probability of financial distress. This may take the form of administration (Railtrack and Mayflower), receivership (Energis), capital reconstruction (Marconi), rescue rights issue, major disposals or spin-offs to repay creditors (Invensys), government rescue (British Energy), or acquisition as an alternative to bankruptcy.

Various statistical conditions need to be met for valid application of the methodology.⁸ In addition, alternative statistical approaches such as quadratic discriminant analysis (e.g. Altman et al., 1977), logit and probit models (e.g. Ohlson, 1980;

² For example, Altman and Narayanan (1997) review 44 separate published studies relating to 22 countries outside the US.

³ Taffler (1984) also describes a model for analysing retail firms. His unpublished service company model is similar in form.

⁴ Altman's (1968) model was also originally developed from samples of industrial companies alone but has conventionally been applied across the whole spectrum of non-financial firms.

⁵ Although smaller than samples currently used in building failure prediction models, the model was constructed using all firms failing subsequent to the Companies Act, 1967, which significantly increased data availability.

⁶ Data was transformed and Winsorised and differential prior probabilities and misclassification costs were taken into account in deriving an appropriate cut-off between the two groups. The Lachenbruch (1967) hold-out test provided two apparent classification errors.

⁷ Factor analysis of the underlying ratio data should be undertaken to ensure collinear ratios are not included in the model leading to lack of stability and sample bias, and to help interpret the resulting model component ratios.

⁸ These are discussed in Taffler (1983) with regard to the model described here and more generally in Taffler (1982), Jones (1987) and Keasey and Watson (1991) and need not detain us here.

Table 1
Model for analysing fully listed industrial firms

The model is given by:

$$z = 3.20 + 12.18 \cdot x_1 + 2.50 \cdot x_2 - 10.68 \cdot x_3 + 0.029 \cdot x_4$$

where

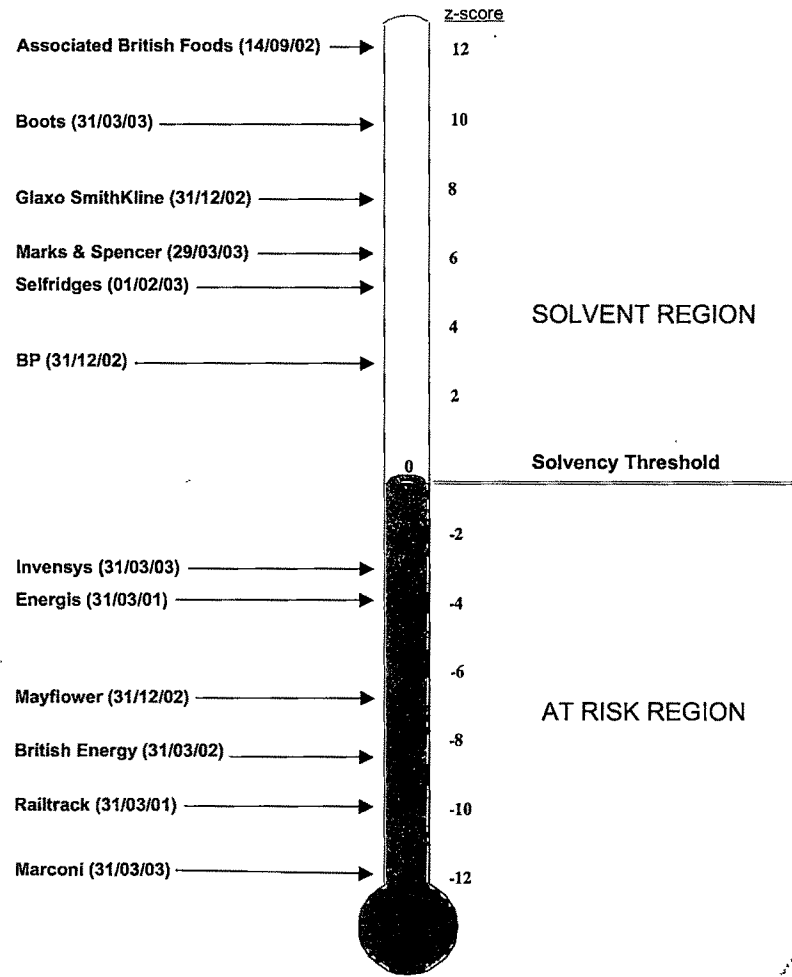
- x_1 = profit before tax/current liabilities (53%)
- x_2 = current assets/total liabilities (13%)
- x_3 = current liabilities/total assets (18%)
- x_4 = no-credit interval¹ (16%)

The percentages in brackets after the variable descriptors represent the Mosteller-Wallace contributions of the ratios to the power of the model. Via factor analysis, x_1 measures profitability, x_2 working capital position, x_3 financial risk and x_4 liquidity.

¹ no-credit interval = (quick assets – current liabilities)/daily operating expenses with the denominator proxied by (sales – PBT – depreciation)/365

Figure 1
The Solvency Thermometer

Firms with computed z-score < 0 are at risk of failure; those with z-score > 0 are financially solvent.



Zmijewski, 1984; Zavgren, 1985), mixed logit (Jones and Hensher, 2004), recursive partitioning (e.g. Frydman et al., 1985), hazard models (Shumway, 2001; Beaver et al., 2005) and neural networks (e.g. Altman et al., 1994) are used. However, since the results generally do not differ from the conventional linear discriminant model approach in terms of accuracy, or may even be inferior (Hamer, 1983; Lo, 1986; Trigueiros and Taffler, 1996), and the classical linear discriminant approach is quite robust in practice (e.g. Bayne et al., 1983) associated methodological considerations are of little importance to users.

3. Forecasting ability

Since the prime purpose of z-score models, implicitly or explicitly, is to forecast future events, the only valid test of their performance is to measure their true *ex ante* prediction ability.⁹ This is rarely done and when it is, such models may be found lacking. This could be because significant numbers of firms fail without being so predicted (type I errors). However, more usually, the percentage of firms classified as potential failures that do not fail (type II errors) in the population calls the operational utility of the model into question.¹⁰ In addition, statistical evidence is necessary that such models work better than alternative simple strategies (e.g. prior year losses). Testing models only on the basis of how well they classify failed firms is not the same as true *ex ante* prediction tests.¹¹

3.1. What is failure?

A key issue, however, is what is meant by corporate failure. Demonstrably, administration, receivership or creditors' voluntary liquidation constitute insolvency.¹² However, there are alternative events which may approximate to, or are clear proxies for, such manifestations of outright failure and result in loss to creditors and/or shareholders. Capital reconstructions, involving loan write-downs and debt-equity swaps or equivalent, can equally be classed as symptoms of failure, as can be acquisition of a business as an alternative to bankruptcy or major closures or forced disposals of large parts of a firm to repay its bankers. Other symptoms of financial distress, more difficult to identify, may encompass informal government support or guarantees, bank intensive care monitoring or loan covenant renegotiation for solvency reasons, etc. Nonetheless, in the analysis in this paper, we work exclusively with firm insolvencies on the basis these are clean measures, despite probably weakening the apparent predictive ability of the z-score model, in particular in terms of increasing the type II error rate.

3.2. The population risk profile

To assess the z-score model's performance in

practical application, z-scores for the full population of non-financial firms available electronically and fully listed on the London Stock Exchange for at least two years at any time between 1979 (subsequent to when the model was developed) and 2003, a period of 25 years, are computed.^{13,14} During this period there were 232 failures in our sample; 223 firms (96.1%) had z-scores < 0 based on their last published annual accounts prior to failure indicating they had potential failure profiles.¹⁵ The average time to failure from the date of the last annual accounts is 13.2 months, similar to that reported by Ohlson (1980) for the US.¹⁶ The equivalent median figure is 13.0 months.

Figure 2 shows the percentage of firms in our sample with negative z-scores and percentage of firms with negative PBT both of which vary over time. In the case of z-scores, the low of 14% is reg-

⁹ Whereas techniques such as the Lachenbruch (1967) jack-knife method, which can be applied to the original data to test for search and sample bias, are often used, inference to performance on other data for a future time period cannot be made because of potential lack of population stationarity.

¹⁰ For example, the Bank of England model (1982) was classifying over 53% of its 809 company sample as potential failures in 1982, soon after it was developed.

¹¹ Good examples are Begley et al. (1996) who conduct out-of-sample tests of type I and type II error rates for 1980s failures for both the Altman (1968) and Ohlson (1980) models and Altman (2002: 17–18) who provides similar sample statistics for his 1968 model through to 1999. However, neither study allows the calculation of true *ex ante* predictive ability, the acid test of such model purpose, because the full population of non-failed firms is not considered.

¹² The term bankruptcy, used in the US, applies only to persons in the UK.

¹³ The required accounting data was primarily collected from the Thomson Financial *Company Analysis* and *EXSTAT* financial databases which between them have almost complete coverage of UK publicly fully listed companies. For the small number of cases not covered, *MicroEXSTAT* and *Datastream* were also used in that order. We have assumed a lag of five months between the balance sheet date and public availability of the annual accounts.

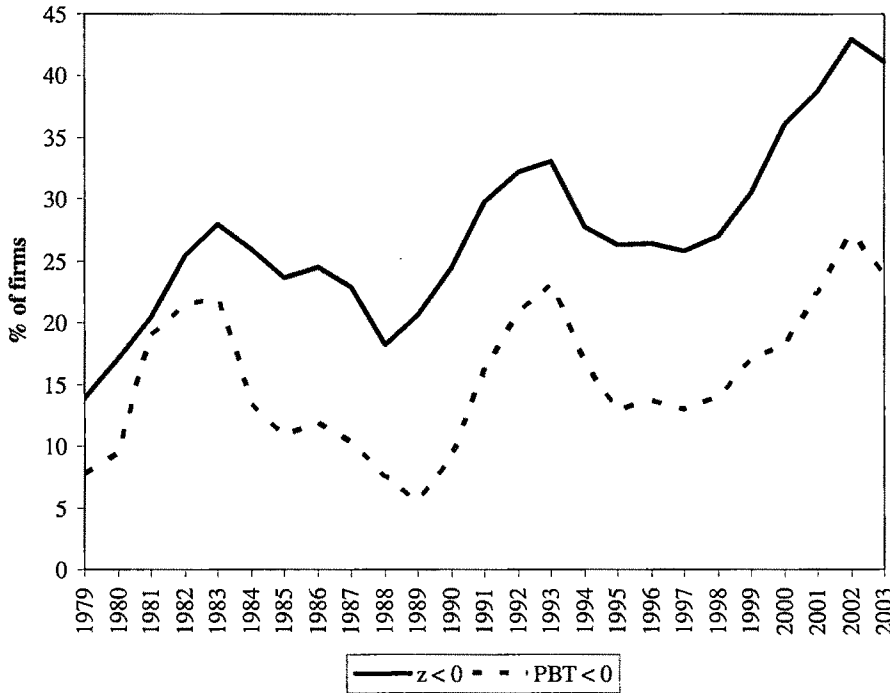
¹⁴ Altman (1993) claims that a respecification of his 1968 z-score model recalculated using his original sample of publicly traded firms but substituting the book value of equity for market value in his ratio 4 can be applied to non-listed firms. However, this is incorrect. The financial profiles of privately owned firms differ significantly to those of listed firms. As such, models need to be developed directly from samples of failed and non-failed non-listed firms. It would be invalid to apply the z-score model described here to such entities.

¹⁵ Of the nine firms misclassified, six had negative z-scores on the basis of their latest available interim/preliminary accounts prior to failure. On this basis, only three companies could not have been picked up in advance, including Polly Peck, where there were serious problems with the published accounts. Among other issues, there is a question mark over a missing £160m of cash and even the interim results, published only 17 days before Polly Peck's shares were suspended, show profits before tax of £110m on turnover of £880m. Whereas, as argued below, such multivariate models are quite robust to window dressing, this obviously cannot apply to major fraud.

¹⁶ The z-score becomes negative on average 2.4 years (median = 2.0) before failure. The equivalent PBT figures are 1.4 (1.0) years respectively.

Figure 2
Percentage of firms at risk

Z-scores and PBT figures for all the firms in our sample are computed based on their full-year accounts with financial year-ends between May 1978 and April 2004. The figures for year t are based on full-year accounts of all the firms in the sample with balance sheet dates between May of year $t-1$ and April of year t .



istered in 1979 and the graph peaks at 43% in 2002, higher than the peaks of 33% in 1993 and 28% in 1983 at the depths of the two recessions. The overall average is 27%. The percentage of firms with negative profit before tax (PBT) shows a similar time-varying pattern but is lower with an overall average of 15%.

3.3. True *ex ante* predictive ability

We use two different methods to assess the power of such models to capture the risk of financial distress – tests of information content and tests of predictive ability. Three alternative classification rules are employed for statistical comparison – a proportional chance model which randomly classifies all firms as failures or non-failures based on *ex post* population failure rates, a naïve model that classifies all firms as non-failures and a simple accounting-based model that classifies firms with negative PBT as potential failures and those with $PBT > 0$ as non-failures.¹⁷ Also, misclassification costs need to be properly taken into account. In addition, we need to consider if the magnitude of the negative

z-score has further predictive content.

3.3.1. Relative information content tests

As illustrated above, z-scores are widely used as a proxy for risk of failure. It is therefore important to test if they carry any information about the probability of failure and, hence, whether it is justified to use them as a proxy for bankruptcy risk. We also test whether the same information can be captured by our simple prior-year loss-based classification rule.

To test for information content, a discrete hazard model of the form similar to that of Hillegeist et al. (2004) is used:

$$P_{i,t} = \frac{e^{X_{i,t}\beta}}{1 + e^{X_{i,t}\beta}} \quad (1)$$

where:

- $P_{i,t}$ = probability of failure of firm i in year t ,
- X = column vector of independent variables, and
- β = column vector of estimated coefficients.

This expression is of the same form as logistic regression; Shumway (2001) shows that it can be estimated as a logit model. However, the standard

¹⁷ The authors are indebted to Steven Young for this suggestion.

Table 2
Relative information content

Z-score and PBT figures for all the firms in our sample are computed based on their last available full-year accounts with financial year-ends from May 1978 until April 2004. Firms are then tracked till delisting or publication of their next full-year accounting statements to identify those that failed. The z-score model classifies all firms with $z < 0$ as potential failures and the PBT model classifies all firms with $PBT < 0$ as potential failures. Figures in brackets are the Wald statistic from the logistic regression with dependent variable taking a value of 1 if the firm fails subsequent to its last available annual accounts, 0 otherwise. The Wald and model χ^2 statistics are adjusted for the fact that there are several observations from the same firm by dividing by 10.74, the average number of observations per firm.

Variable	Model (i)	Model (ii)
Constant	-3.46 (241.12)	-3.24 (147.75)
PBT		-2.49 (28.75)
Z-score	-4.24 (14.46)	
Model χ^2	48.40	30.41
Log-likelihood	-1077	-1173
Pseudo- R^2	0.20	0.13

With 1 degree of freedom, critical Wald and χ^2 values at 1%, 5% and 10% level are 6.63, 3.84 and 2.71 respectively.

errors will be biased downwards since the logit estimation treats each firm year observation as independent, while the data has multiple observations for the same firm. Following Shumway (2001) we divide the test statistic by the average number of observations per firm to obtain an unbiased statistic.

We estimate two models; model (i) with z-score dummy (0 if negative, 1 otherwise) and model (ii) with PBT dummy (0 if negative, 1 otherwise) as independent variables. The dependent variable is the actual outcome (1 if failed, 0 otherwise). The parametric test of Vuong (1989) is used to test whether the log-likelihood ratios of our two logit models differ significantly. Table 2 provides the results.

Coefficients on both z-score in model (i) and PBT in model (ii) are significant at better than the 1% level showing both variables carry significant information about corporate failure. However, the coefficient on z-score (-4.2) is much larger than that on PBT (-2.5) even though they are both measured on the same scale of 0 to 1 and the log-likelihood statistic for model (i) is smaller than that for model (ii) demonstrating that, on this basis, the z-score carries more information about

failure than does PBT. The difference between the two log-likelihood statistics is statistically significant (Vuong test statistic = 4.62; $p < 0.01$).

These results show that our z-scores do carry information about corporate failure and are thus a valid proxy for risk of financial distress. They also show that z-score dominates PBT.

3.3.2. Test of predictive ability

Only a proportion of firms at risk, however, will suffer financial distress. Knowledge of the population base rate allows explicit tests of the true *ex ante* predictive ability of the failure prediction model where the event of interest is failure *in the next year*. We use the usual 2x2 contingency table approach to assess whether our two accounting-based models, z-score and prior-year loss, do better than the proportional chance model.

The contingency table for z-score is provided in panel A of Table 3. It shows that of the 232 failures in our sample; 223 firms (96.1%) had z-scores < 0 based on their last accounts prior to failure indicating they had potential failure profiles. In total, over the 25-year period, there were 7,325 (27%) firm years with $z < 0$ and 19,918 (73%) with $z > 0$. The overall conditional probability of failure given a negative z-score is 3.04% (223/7,325). This differs significantly to the base failure rate of 0.85% (232/27,243) at better than $\alpha = 0.001$ ($z = 20.4$).¹⁸ Similarly, the conditional probability of non-failure given a positive z-score is 99.95% (19,909/19,918),

¹⁸ $z = (p - \pi) / \sqrt{\pi(1 - \pi)/n}$ where p = sample proportion, π = probability of chance classification and n = sample size. For the conditional probability of failure given $z < 0$, $p = 0.0304$, $\pi = 0.0085$ and n = firms with $z < 0 = 7,325$.

Table 3
Classification matrix for z-scores and prior-year losses

Z-score and PBT figures for all the firms in our sample are computed based on their last available full-year accounts with financial year-ends from May 1978 until April 2004. Firms are then tracked till delisting or publication of their next full-year accounting statements to identify those that failed. The z-score model classifies all firms with $z < 0$ as potential failures and the PBT model classifies all firms with $PBT < 0$ as potential failures. The null hypothesis of no association between z (PBT) and failure is tested using the χ^2 statistic.

Panel A. Z-score model

	<i>Failed</i>	<i>Non-failed</i>	<i>Total</i>
$z < 0$	223 (96%)	7,102 (26%)	7,325 (27%)
$z > 0$	9 (4%)	19,909 (74%)	19,918 (73%)
Total	232	27,011	27,243
χ^2	570.5		

Panel B. Prior-year loss model

	<i>Failed</i>	<i>Non-failed</i>	<i>Total</i>
$PBT < 0$	157 (68%)	4,013 (15%)	4,170 (15%)
$PBT > 0$	75 (32%)	22,998 (85%)	23,073 (85%)
Total	232	27,011	27,243
χ^2	495.0		

which differs significantly from the base rate of 99.15% at better than $\alpha = 0.001$ ($z = 12.4$).¹⁹ In addition, the computed χ^2 statistic is 570.5 and strongly rejects the null hypothesis of no association between failure and z-score. Thus, the z-score model possesses true forecasting ability on this basis.

Panel B of Table 3 provides the results of using prior year loss as the classification criteria. It shows that 68% of the 232 failures over the 25-year period registered negative PBT on the basis of their last accounts before failure. In total there were 4,170 (15%) firm years with $PBT < 0$ and 23,073 (85%) with $PBT > 0$. On this basis, the overall conditional probability of failure given a negative PBT is 3.76% (157/4,170), which differs significantly to the base failure rate of 0.85% at better than $\alpha = 0.001$ ($z = 20.5$).²⁰ Similarly, the

conditional probability of non-failure given a positive PBT is 99.67% (22,998/23,073), which differs significantly from the base rate of 99.15% at better than $\alpha = 0.001$ ($z = 8.7$).²¹ The χ^2 statistic is 495.0 and strongly rejects the null hypothesis of no association between failure and loss in the last year. On this basis, a simple PBT-based model also appears to have true forecasting ability.

These results confirm the evidence of Table 2, both z-scores and PBT have true failure forecasting ability, however, they do not directly indicate which of the two models is superior.

3.3.3. Comparing the predictive ability of z-scores and PBT using the ROC curve

The Receiver Operating Characteristics (ROC) curve is widely used for assessing various rating methodologies (see Sobehart et al., 2000 for details). It is constructed by plotting 1 – type I error rate against the type II error rate and the model with larger area under the curve (AUC) is considered to be a better model. The Gini coefficient or accuracy ratio is just a linear transformation of the area under the ROC curve, i.e.:

$$\text{Gini coefficient} = 2 * (\text{AUC} - 0.50) \quad (2)$$

The area under the ROC curve is estimated using the Wilcoxon statistic following Hanley and

¹⁹ For the conditional probability of non-failure given $z > 0$ at the beginning of the year, $p = 0.9995$, $\pi = 0.9915$ and $n = 19,918$.

²⁰ $z = (p - \pi) / \sqrt{\pi(1 - \pi)/n}$ where p = sample proportion, π = probability of chance classification and n = sample size. For the conditional probability of failure given $PBT < 0$, $p = 0.0376$, $\pi = 0.0085$ and n = firms with $PBT < 0 = 4,170$.

²¹ For the conditional probability of non-failure given $PBT > 0$ at the beginning of the year, $p = 0.9967$, $\pi = 0.9915$ and $n = 23,073$.

McNeil (1982) who demonstrate that it is an unbiased estimator (also see Faraggi and Reiser, 2002).

The standard error of area under the ROC curve is given by (Hanley and McNeil, 1982):

$$se(A) = \sqrt{\frac{A(1-A) + (n_F - 1)(Q1 - A^2) + (n_{NF} - 1)(Q2 - A^2)}{n_F n_{NF}}} \quad (3)$$

where:

A = area under the ROC curve,
 n_F = number of failed firms in the sample,
 n_{NF} = number of non-failed firms in the sample,
 $Q1 = A/(2-A)$, and
 $Q2 = 2A^2 / (1+A)$

and the test statistic is:

$$z = \frac{A}{se(A)} \quad (4)$$

where z is a standard normal variate.

To compare the AUC for two different models, the test statistic is:²²

$$z = \frac{A_1 - A_2}{\sqrt{(se(A_1))^2 + (se(A_2))^2}} \quad (5)$$

where again z is the standard normal variate.

Figure 3 plots the AUC for the z -score and PBT models with the diagonal line representing the proportional chance model, while the AUC for the naïve model will be zero (i.e. (0,0)).²³ Figure 3 shows that the z -score model has a larger AUC (0.85) than the PBT model which in turn has a larger AUC (0.76) than the proportional chance model.

Table 4 presents summary statistics and shows that both z -score and PBT models outperform the proportional chance model ($z = 21.9$ and 14.4 respectively). It also shows that the z -score model outperforms the PBT model ($z = 3.5$). On this basis, while both z -score and PBT perform better than random classification, again the z -score model clearly outperforms the PBT model.

3.3.4. Differential error costs

All the tests presented so far assume the cost of misclassifying a firm that fails (type I error) is the same as the cost of misclassifying a firm that does not fail (type II error). However, in the credit market, the cost of a type I error is not the same as the

cost of a type II error. In the first case, the lender can lose up to 100% of the loan amount while, in the latter case, the loss is just the opportunity cost of not lending to that firm. In assessing the practical utility of failure prediction models' ability, then, differential misclassification costs need to be explicitly taken into account.

Blöchliger and Leippold (2006) provide a framework to assess the economic utility of different credit risk prediction models in a competitive loan market. The following assumptions apply for an illustrative accept/reject cut-off regime:²⁴

1. Banks use a model to either accept or reject customers.
2. The risk premium is exogenous (75 basis points), i.e. all customers that are accepted will be offered the same rate.
3. The loss from lending to a customer that defaults is 40% of the loan amount.
4. A customer will randomly select a bank for his/her loan application. If this application is rejected, he/she will then randomly select another bank, and so on until the loan is granted.

For our analysis, we assume there are four banks in the market with total loan demand of £100bn. Without loss of generality we further assume all loans are of the same amount and for a one-year period. Bank 1 uses the z -score model for making loan decisions (accept all customers with z -score > 0 , reject all others), Bank 2 employs the prior-year loss model (accept all customers with PBT > 0 , reject all others), Bank 3 uses the proportional chance model (i.e. randomly accept or reject customers based on overall failure rate) and Bank 4 adopts a naïve approach (i.e. accept all customers). Table 5 provides the summary statistics for the four banks.

Table 5 shows that while Bank 1 which employs the z -score model has the smallest market share (19%), it has loans of the best credit quality with a default rate of just 1%. This rate compares to that of 11% for Bank 2. Bank 1 also earns higher profits than any other bank despite having the smallest loan portfolio and outperforms the next best, Bank 2, by 24% (14 basis points in absolute terms) in terms of risk-adjusted return on capital employed.

Figure 4 provides a sensitivity analysis for the different models as the cost of a type I error changes. Figure 4A plots profitability and shows that the proportional chance model generates lower profits than the PBT model for the cost of a type I error in the range of 20% to 80% and generates lower profits than the z -score model for a type I error cost in excess of 22%. It also shows that the z -score model leads to higher profits than the PBT model for cost of a type I error in excess of 36%. Figure 4B plots the risk-adjusted return on capital employed (ROCE) and shows that the z -score

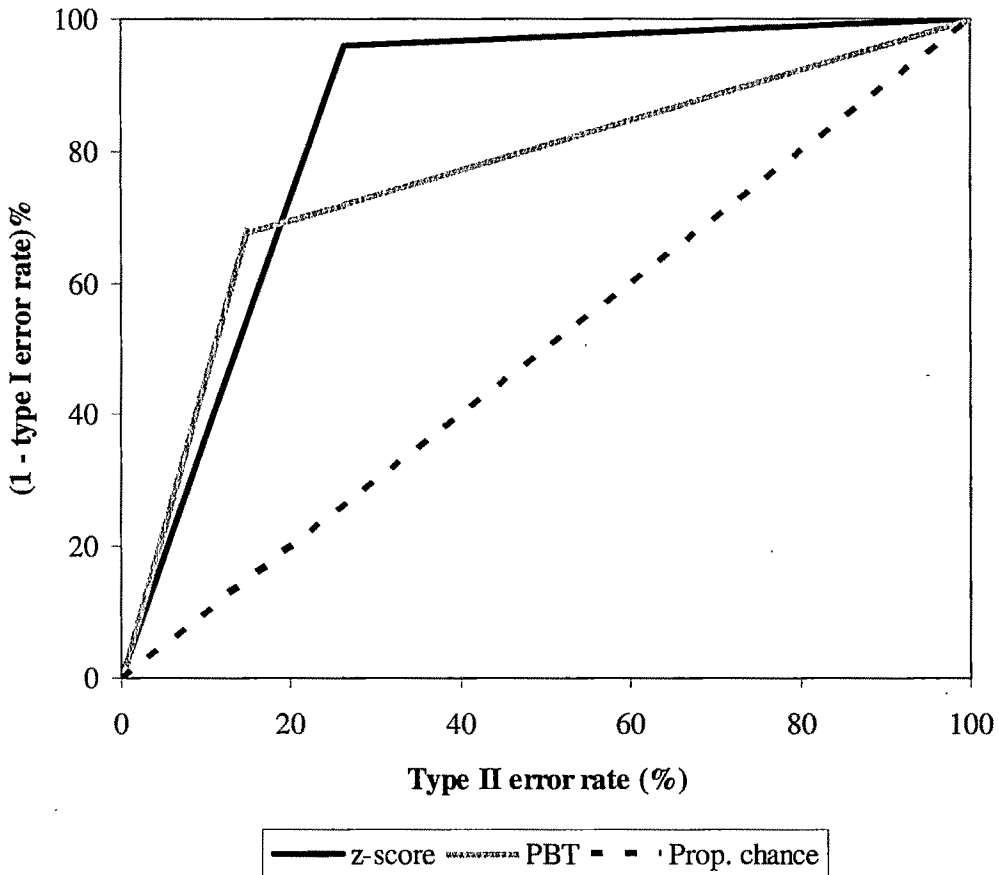
²² Hanley and McNeil (1983) propose an adjustment for the fact that the two AUCs are derived from the same data and will therefore be correlated. The effect of this induced correlation will be to reduce the standard error. Our test statistics which ignore this are therefore conservative.

²³ The proportional chance model randomly classifies firms as failed/non-failed based on the population failure rate while the naïve model classifies all firms as non-failed.

²⁴ Although this regime may appear an oversimplification, this is exactly how the credit insurance market works in practice.

Figure 3
ROC curves

Z-score and PBT figures for all the firms in our sample are computed based on their last available full-year accounts with financial year-ends from May 1978 until April 2004. Firms are then tracked till delisting or publication of their next full-year accounting statements to identify those that failed. The z-score model classifies all firms with $z < 0$ as potential failures, the PBT model classifies all firms with $PBT < 0$ as potential failures, the proportional chance model randomly classifies firms as failed/non-failed based on overall failure rate for our sample period (0.85%) and the naïve model classifies all firms as non-failed. The type I error rate for the z-score (prior-year loss) model is computed as the number of failed firms with positive z-score (PBT) divided by the total number of failures. The type II error rate for the z-score (prior-year loss) model is computed as the number of non-failed firms with negative z-score (PBT) divided by the total number of non-failures. The respective type I and type II error rates for the proportional chance model are 99.15% and 0.85%. The naïve model has a type I error rate of 100% and type II error rate of 0%, and is located at point (0,0).



model dominates the other two models across the entire range of type I error costs with the difference in the risk adjusted ROCE between z-score and PBT models ranging from 7 to 28 basis points. In relative terms, this gives z-score risk adjusted profitability outperformance of between 10% and 65%.²⁵ The economic benefit of using the z-score model in this illustrative setting is thus clear.

²⁵ Blöchliger and Leippold (2006) show in their simulation models that these results are lower bound estimates; in more complex settings, the profitability differences are likely to be larger.

3.3.5. Probability of failure and severity of negative z-score

Most academic research in this field has focused exclusively on whether the derived z-score is above or below a particular cut-off. However, does the magnitude of the (negative) z-score provide further information on the actual degree of risk of failure within the next year for $z < 0$ firms?

To explore whether the z-score construct is an ordinal or only a binary measure of bankruptcy risk, we explore failure outcome rates by negative z-score quintiles over our 25-year period. Table 6 provides the results.

Table 4
ROC curves: summary statistics

Z-score and PBT figures for all the firms in our sample are computed based on their last available full-year accounts with financial year-ends from May 1978 until April 2004. Firms are then tracked till delisting or publication of their next full-year accounting statements to identify those that failed. The z-score model classifies all firms with $z < 0$ as potential failures and the PBT model classifies all firms with $PBT < 0$ as potential failures. The AUC is estimated as a Wilcoxon statistic, and the Gini coefficient (Gini) is derived from the AUC using equation (2) in the text. The standard error (se) of the AUC is estimated using equation (3), and the z-statistic (z) for the test of significance of the AUC is estimated using equations (4) and (5) in the text.

	<i>AUC</i>	<i>se</i>	<i>z</i>	<i>Gini</i>
Z-score	0.85	0.0159	21.9	0.70
PBT	0.76	0.0184	14.4	0.53
Difference	0.09	0.0243	3.5	

Table 5
Bank profitability using different models

Z-score and PBT figures for all the firms in our sample are computed based on their last available full-year accounts with financial year-ends from May 1978 until April 2004. Firms are then tracked till delisting or publication of their next full-year accounting statements to identify those that failed. Bank 1 uses the z-score model that classifies all firms with $z < 0$ as potential failures, Bank 2 employs the PBT model which classifies all firms with $PBT < 0$ as potential failures, Bank 3 adopts the proportional chance model that randomly classifies firms as potentially failed/non-failed based on the average failure rate over the 25-year period (0.85%) and Bank 4 classifies all firms as non-failures using the naïve model. Firms are assumed to randomly choose one of the four banks and if rejected by the first bank, then randomly select one of the other three banks and so on until the loan is granted. The type I error rate represents the percentage of failed firms classified as non-failed by the respective model, and the type II error rate represents the percentage of non-failed firms classified as failed by the respective model. Market share is the expected number of (equal size) loans granted as a percentage of total number of firm years, share of defaulters is the expected number of defaulters to whom a loan is granted as a percentage of total number of defaulters. Revenue is calculated as market size * market share * risk premium and loss is calculated as market size * prior probability of failure * share of defaulters * cost of a type I error in percent. Profit is calculated as revenue – loss. Risk adjusted return on capital employed is calculated as profit divided by market size * market share. For illustrative purposes, we assume the market size to be £100bn, the risk premium to be 0.75% and cost of a type I error to be 40%. The prior probability of failure is taken to be the same as the ex-post failure rate of 0.85% during the sample period.

	<i>Bank 1</i>	<i>Bank 2</i>	<i>Bank 3</i>	<i>Bank 4</i>
Type I error (%)	3.88	32.33	99.15	100.00
Type II error (%)	26.29	14.86	0.85	0.00
Market share (%)	18.67	22.54	29.33	29.48
Share of defaulters (%)	1.08	10.60	43.82	44.51
Revenue (£m)	140.00	169.07	219.94	221.14
Loss (£m)	3.67	36.05	148.98	151.32
Profit (£m)	136.33	133.02	70.96	69.81
Risk-adjusted return on capital employed (%)	0.73	0.59	0.24	0.24

Figure 4
Profitability analysis of using different models

Z-score and PBT figures for all the firms in our sample are computed based on their last available full-year accounts with financial year-ends from May 1978 until April 2004. Firms are then tracked till delisting or publication of their next full-year accounting statements to identify those that failed. Bank 1 uses the z-score model that classifies all firms with $z < 0$ as potential failures, Bank 2 employs the PBT model which classifies all firms with $PBT < 0$ as potential failures, Bank 3 adopts the proportional chance model that randomly classifies firms as potentially failed/non-failed based on the average failure rate over the 25-year period (0.85%) and Bank 4 classifies all firms as non-failures using the naïve model. Firms are assumed to randomly choose one of the four banks and if rejected by the first bank, then randomly select one of the other three banks and so on until the loan is granted. Market share is the expected number of (equal size) loans granted as a percentage of total number of firm years, share of defaulters is the expected number of defaulters to whom a loan is granted as a percentage of total number of defaulters. Revenue is calculated as market size * market share * risk premium and loss is calculated as market size * prior probability of failure * share of defaulters * cost of a type I error in percent. Profit is calculated as revenue – loss. Risk-adjusted return on capital employed is calculated as profit divided by market size * market share. A type I error is classifying a failed firm as non-failed, and a type II error is classifying a non-failed firm as failed by the respective model. For illustrative purposes, we assume the market size to be £100bn and the risk premium to be 0.75%. Figure 4A plots bank risk-adjusted profits and Figure 4B bank risk-adjusted return on capital employed both against cost of a type I error in percent. The corresponding figures for Bank 4 (naïve model) are always less than those for Bank 3 (proportional chance model) and omitted from the graphs for ease of exposition.

Figure 4A
Bank risk-adjusted profit v cost of type I error

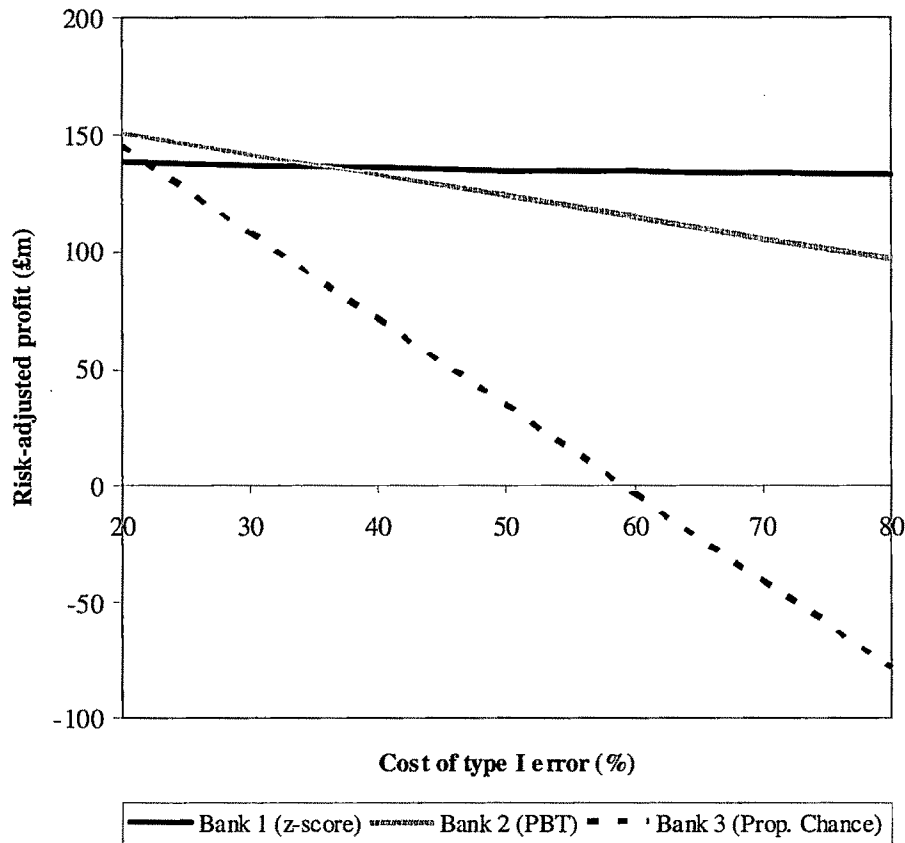


Figure 4
Profitability analysis of using different models (continued)

Figure 4B
Bank risk-adjusted return on capital employed v cost of type I error

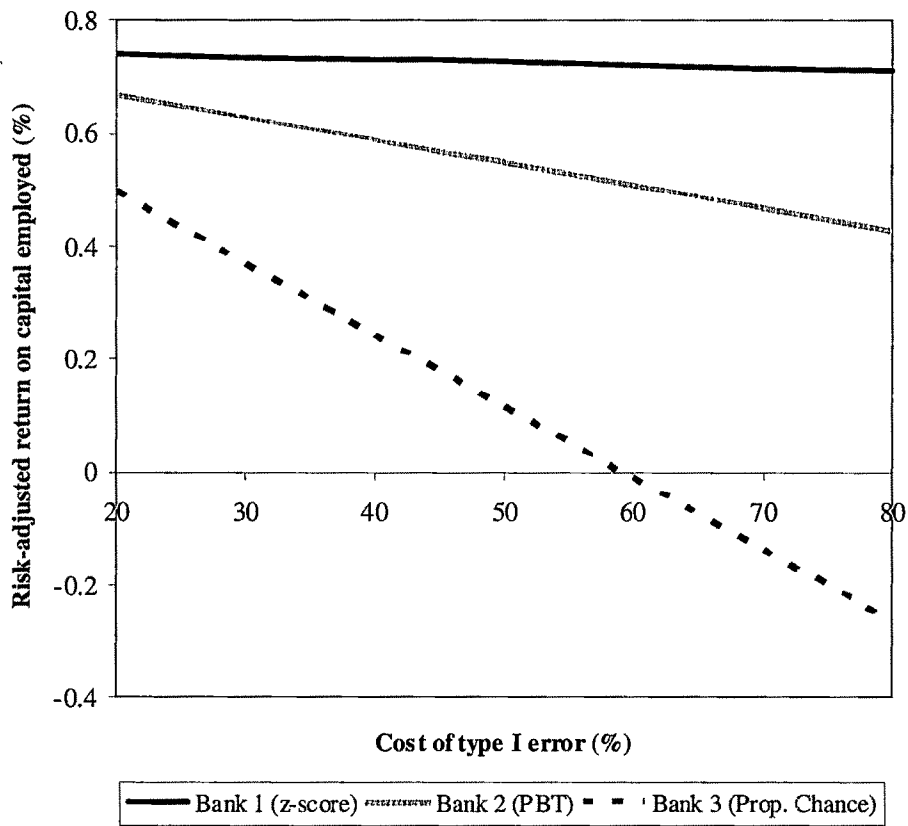


Table 6
Firm failure probabilities by negative z-score quintile

Z-score and PBT figures for all the firms in our sample are computed based on their last available full-year accounts with financial year-ends from May 1978 until April 2004. Each year, the firms are ranked on their z-scores based on the full-year accounts with financial year ending between May of year $t-1$ and April of year t . For the negative z-score stocks, five portfolios of equal number of stocks are formed each year. Firms are then tracked till delisting or publication of their next full-year accounting statements to identify those that failed. The z-score model classifies all firms with $z < 0$ as failures. Entries in the table refer exclusively to the -ve z-score firms in our sample.

Outcome (t)	Negative z-score quintile ($t-1$)					Total firms
	5 (worst)	4	3	2	1 (best)	
Failed (%)	7.1	4.1	2.0	1.3	0.7	223
Non-failed (%)	92.9	95.9	98.0	98.7	99.3	7,102
Number of firms	1,475	1,467	1,466	1,460	1,457	7,325
% of total failures ($n = 232$)	44.8	25.9	12.9	8.2	4.3	96.1

As can be seen, there is a monotononic relationship between severity of z-score and probability of failure in the next year which falls from 7.1% in the worst quintile of z-scores to 0.7% for the least negative quintile. Overall, the weakest 20% of negative z-scores accounts for 45% of all failures and the lowest two quintiles together capture over two thirds (71%) of all cases. A contingency table test of association between z-score quintile and failure rate is highly significant ($\chi^2 = 133.0$).²⁶ As such, we have clear evidence the worse the negative z-score, the higher the probability of failure; the practical utility of the z-score is clearly significantly enhanced by taking into account its magnitude.

4. Temporal stability

Mensah (1984) points out that users of accounting-based models need to recognise that such models may require redevelopment from time to time to take into account changes in the economic environment to which they are being applied. As such, their performance needs to be carefully monitored to ensure their continuing operational utility. In fact, when we apply the Altman (1968) model originally developed using firm data from 1945 to 1963 to non-financial US firms listed on NYSE, AMEX and NASDAQ between 1988 and 2003, we find almost half of these firms (47%) have a z-score less than Altman's optimal cut-off of 2.675. In addition, 19% of the firms entering Chapter 11 during this period had z-scores greater than 2.675.²⁷

Nonetheless, it is interesting to note that, in practice, such models can be remarkably robust and continue to work effectively over many years, as convincingly demonstrated above. Altman (1993: 219–220) reports a 94% correct classification rate for his ZETA™ model for over 150 US industrial bankruptcies over the 17-year period to 1991, with 20% of his firm population estimated as then hav-

ing ZETA™ scores below his cut-off of zero.

In the case of the UK-based z-score model reviewed in this paper, Figure 2 shows how the percentage of firms with at-risk z-scores varies broadly in line with the state of the economy. However, it increases dramatically from around 26% in 1997 to 41% by 2003.²⁸

Factors that might be driving this increase in negative z-score firms in the recent period include (i) the growth in the services sector associated with contraction in the number of industrial firms listed, (ii) the doubling in the rate of loss-making firms between 1997 and 2002, as demonstrated in Figure 2, with one in four firms in 2002 making historic cost losses, even before amortisation of goodwill, (iii) increasing kurtosis in the model ratio distributions indicating reduced homogeneity in firm financial structures, and (iv) increasing use of new financial instruments (Beaver et al., 2005). There are also questions about the impact of significant changes in accounting standards and reporting practices over the life of the z-score model, although as the model is applied using accounting data on a standardised basis, any potential impact of such changes is reduced.

Begley et al. (1996) and Hillegeist et al. (2004) recalculate Altman's original 1968 model updating his ratio coefficients on new data; however, both papers find that their revised models perform less well than the original model. The key requirement is to redevelop such models using ratios that measure more appropriately the key dimensions of firms' *current* financial profiles reflecting the changed nature of their financial structures, performance measures and accounting regimes.

Although our results appear to be in contrast to Beaver et al. (2005), who claim their derived three variable financial ratio predictive model is robust over a 40-year period, their only true *ex ante* tests are based on a hazard model fitted to data from 1962 to 1993 which is tested on data over the following eight years. As such, the authors are only in a position to argue for short-term predictive ability. Interestingly, their hazard model also performs significantly less well than the z-score model reported in this paper over a full 25-year out-of-sample time horizon.²⁹

5. Z-score models: discussion

Z-scores, for some reason, appear to generate a lot of emotion and attempts to demonstrate they do not work (e.g. Morris, 1997). However, much of the concern felt about their use is based on a misunderstanding of what they are and what they are designed to do.

5.1. What a z-score model is

Strictly speaking, what a z-score model asks is 'does this firm have a financial profile more simi-

²⁶ The area under the ROC curve when using z-score quintiles is 0.90 and the corresponding accuracy ratio (Gini coefficient) is 0.80. The finer gradation enhances the power of the model since the area under the curve is significantly larger than when using the binary measure ($z = 2.6$). The details are omitted to save space but are available from the first author on request.

²⁷ Begley et al. (1996) report out-of-sample type I and type II error rates of 18.5% and 25.1% for the Altman (1968) model and 10.8% and 26.6% for the Ohlson (1980) model using small samples of bankrupt and non-bankrupt firms.

²⁸ Model users may wish to make a small ad hoc adjustment of -1.0 to the cut-off from 1997 to account for this in practical application. The type I error rate from 1997 to 2003 does not change but the average type II error rate falls from 35% to 29%. Reducing the cut-off further to -2.0 raises the type I error rate to 15.5% from 11.3% while reducing type II errors to 24%.

²⁹ Beaver et al. (2005) also do not take into account differential error misclassification costs.

lar to the failed group of firms from which the model was developed or the solvent set?' As such, it is descriptive in nature. The z-score model is made up of a number of fairly conventional financial ratios measuring important and distinct facets of a firm's financial profile, synthesised into a single index. The model is multivariate, as are a firm's set of accounts, and is doing little more than reflecting and condensing the information they provide in a succinct and clear manner.

The z-score is primarily a readily interpretable communication device, using the principle that the whole is worth more than the sum of the parts. Its power comes from considering the different aspects of economic information in a firm's set of accounts simultaneously, rather than one at a time, as with conventional ratio analysis. The technique quantifies the degree of corporate risk in an independent, unbiased and objective manner. This is something that is difficult to do using judgement alone. Clearly, to be of value, a z-score model must demonstrate true *ex ante* predictive ability.

5.2. Lack of theory

Z-score models are also commonly censured for their perceived lack of theory. For example, Gambling (1985: 420) entertainingly complains that:

'... this rather interesting work (z-scores) ... provides no theory to explain insolvency. This means it provides no pathology of organizational disease ... Indeed, it is as if medical research came up with a conclusion that the cause of dying is death ... This profile of ratios is the corporate equivalent of ... "We'd better send for his people, sister", whether the symptoms arise from cancer of the liver or from gunshot wounds.'

However, once again, critics are claiming more for the technique than it is designed to provide. Z-scores are not explanatory theories of failure (or success) but pattern recognition devices. The tool is akin to the medical thermometer in indicating the probable presence of disease and assisting in tracking the progress of and recovery from such organisational illness. Just as no one would claim this simple medical instrument constitutes a scientific theory of disease, so it is only misunderstanding of purpose that elevates the z-score from its simple role as a measurement device of financial risk, to the lofty heights of a full-blown theory of corporate financial distress.

Nonetheless, there are theoretical underpinnings to the z-score approach, although it is true more research is required in this area. For example, Scott (1981) develops a coherent theory of bankruptcy and, in particular, shows how the empirically determined formulation of the Altman et al. (1977)

ZETA™ model and its constituent variable set fits the postulated theory quite well. He concludes (p.341) 'Bankruptcy prediction is both empirically feasible and theoretically explainable'. Taffler (1983) also provides a theoretical explanation of the model described in this paper and its constituent variables drawing on the well-established liquid asset (working capital) reservoir model of the firm which is supplied by inflows and drained by outflows. Failure is viewed in terms of exhaustion of the liquid asset reservoir which serves as a cushion against variations in the different flows. The component ratios of the model measure different facets of this 'hydraulic' system.

There are also sound practical reasons why this multivariate technique works in practice. These relate to (i) the choice of financial ratios by the methodology which are less amenable to window dressing by virtue of their construction, (ii) the multivariate nature of the model capitalising on the swings and roundabouts of double entry, so manipulation in one area of the accounts has a counterbalancing impact elsewhere in the model, and (iii) generally the empirical nature of its development. Essentially, potential insolvency is difficult to hide when such 'holistic' statistical methods are applied.

6. Concluding reflections

This study describes a widely-used UK-based z-score model including publication of its ratio coefficients for the first time and explores its track record over the 25-year period since it was developed. We believe this is the first study to conduct valid tests of the true predictive ability of such models explicitly. The paper demonstrates that the z-score model described, which was developed in 1977, has true failure prediction ability and typifies a far more profitable modelling framework for banks than alternative, simpler approaches. Such z-score models, if carefully developed and tested, continue to have significant value for financial statement users concerned about corporate credit risk and firm financial health. They also demonstrate the predictive ability of the underlying financial ratios when correctly read in a holistic way. The value of adopting a formal multivariate approach, in contrast to ad hoc conventional one-at-a-time financial ratio calculation in financial analysis, is evident.

Z-score models, despite their long history and continuing extensive use by practitioners and researchers, still generate much heat among academics, who sometimes appear to be less concerned about practical relevance than elegant economic theory. The widespread theoretical arguments in favour of market based option pricing models (e.g. Kealhofer, 2003; Vassalou and Xing, 2004), such as those provided commercially by Moody's KMV

(see Saunders and Allen, 2002: 46–64 for more details) are illustrative of this, despite there being no evidence of their superior performance in the bankruptcy prediction task compared with the simple z-score approach (see e.g. Hillegeist et al., 2004; Reisz and Perlich, 2004; Agarwal and Taffler, 2007). Researchers and practitioners are advised to subject all such modelling approaches first to thorough empirical testing as in this paper.

A final point relates to the continued misunderstanding of the specific nature of z-score models which can only be appropriately applied to the population of firms from which they were developed. As such, it is totally wrong and potentially dangerous to seek to apply the very accessible Altman (1968) US model in market environments such as the UK. It would be similarly inappropriate to draw any inferences from seeking to apply the listed firm z-score model described in this paper to UK privately-owned firms which have very different financial characteristics. Separate models need to be developed for analysing the financial health of unlisted firms. Falkenstein et al. (2000) show that the distributional properties of listed and private firm ratios are significantly different and conclude (p.46):

‘A model fit using public data will deviate systematically and adversely from a model fit using private data, as applied to private firms.’

In addition, seeking to update the coefficients of such models using recent data is unlikely to improve their classificatory ability as any redeveloped z-score model component ratios need to reflect the current key dimensions of firm financial profiles, and ratio set and coefficient estimates need to be jointly determined. If such models start to show signs of age, albeit their longevity as demonstrated empirically in this paper can be impressive, then completely new z-score models should be developed unconstrained by prior model ratios.

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The effect of large audit firm mergers on audit pricing in the UK

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Abstract—This paper examines the effects on UK audit market concentration and pricing of mergers between the large audit firms and the demise of Andersen. Based on data over the period 1985–2002, it appears that mergers contributed to a rise in concentration ratios to levels that suggest concern about the potential for monopoly pricing. The high concentration ratios have not improved the level of price competition in the UK audit market. Our pooled models suggest that concentration ratios are associated with higher audit fees. The evidence suggests that the effects of mergers between big firms on brand name fee premium and on price competition vary depending on the particular circumstances. The brand name premium is strongest for the largest quartile of companies prior to the mergers. After the Big Six mergers, the premium increases for average-sized companies but falls for the smallest and largest companies. Following the PricewaterhouseCoopers merger, the premium increases for below median-sized clients but decreases for above-median sized clients. For the Deloitte-Andersen transaction, the premium falls for the smallest and largest companies but increases for those in the second quartile. Our results provide evidence that auditees are likely to pay higher fees if their auditor merges with a larger counterpart. We attribute merger-related fee hikes to product differentiation, rather than anti-competitive pricing.

Key words: concentration, mergers, pricing, oligopoly, choice

1. Introduction

A large number of audit firms have combined in the UK since the 1980s. Table 1 shows that the various mergers and the demise of Andersen have reduced the number of first-tier accounting firms (hereafter Big Firms) from eight in 1985 to four in 2002. Industrial economists use the structure-conduct-performance paradigm to urge regulators to be wary of reductions in the number of suppliers. Interesting research questions raised by this paradigm are how and to what extent have the structure of the audit market and the pricing policies of the major accounting firms been affected by the mergers and Andersen transaction? We examine audit pricing in the context of the industry restructuring that occurred during the 1980–2003 period as a re-

sult of mergers between large audit firms and the disappearance of Andersen (hereinafter referred to as the ‘Andersen transaction’).

This study contributes to the literature by investigating the effect of structural changes in the market for audit services on concentration and the pricing of the audits of UK listed companies. The UK provides an interesting empirical setting for a number of reasons. UK companies have long reported audit fee information in their annual financial statements (*Companies Act 1967*), making it possible to carry out a longitudinal study that is not yet possible in the US.¹ Furthermore, the London market is one of the world’s largest, making it easier to test theories of audit pricing than in small markets like Hong Kong. We have exploited these institutional features to conduct a more comprehensive study over a longer time frame than in the prior literature.

We find that the largest increases in concentration ratios coincided with Big Firm mergers in 1989, 1990 and 1997. By 2002, concentration ratios reached levels that are consistent with a market structure of just over four equal sized firms, exceeding levels normally associated with a tight oligopoly. These structural changes appear to have had a variable effect on audit fees. There is some

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¹ US firms have only been required to disclose the fees paid to auditors in statements filed on or after 5 February 2001 (Securities and Exchange Commission, 2000). Researchers using US data have therefore had to focus on measures like the number of audits, clients’ turnover or clients’ asset values as the measurement base because of the lack of available audit fee data (Moizer and Turley, 1989: 42).

Table 1
History of mergers and other transactions involving first-tier accounting firms since 1984

<i>Date</i>	<i>Country</i>	<i>Attempted merger</i>	<i>D-A transaction</i>	<i>Failure/Success</i>
1984	US and UK	PW and DH		Failure
1986	US and UK	PM and KMG		Success
1989	US and UK	EW and AY		Success
1989	US and UK	PW and AA		Failure
1989	US	DH and TR		Success
1989	UK	DH and TR		Failure
1990	UK	DH and CL		Success
1990	UK	TR and SP		Mainly success
1994	US and UK	AA and BH		Mixed
1997	US and UK	CL and PW		Success
1997	US and UK	EY and KPMG		Failure
2002	UK		D-A	Success

Audit partnerships are named as follows: AA = Arthur Andersen; A = Andersen; AY = Arthur Young; BH = Binder Hamlyn; CL = Coopers and Lybrand; D = Deloitte; DH = Deloitte Haskins and Sells; EW = Ernst and Whinney; EY = Ernst and Young; KMG = KMG Thomson McLintock; KPMG = KPMG; PM = Peat Marwick; PW = Price Waterhouse; SP = Spicer and Pegler and TR = Touche Ross.

evidence to suggest that the high concentration ratios have reduced the level of price competition, an effect that may be attributed to product differentiation. The ability of large audit firms to charge a brand premium might be a function of willingness to pay. This might be expected to be stronger for larger clients, and this is what we observe in the 1985–1988 period before the mergers. However, the pattern is more complex in the later part of our sample period. Our findings indicate that the brand name premium increased for average-sized companies (i.e. those in the second and third size quartiles) after the Big Six mergers but fell for the smallest and the largest companies. Following the PricewaterhouseCoopers merger, the brand name premium increased (decreased) for clients whose

size is below the median (above the median). The picture is even more complex following the Andersen transaction – the premium fell for the smallest and largest client quartiles but increased for those in the second quartile. We attribute these findings to the Big Firms engaging in a product differentiation strategy. Our findings using nominal prices indicate that the 1989 merger raised the audit fees of Arthur Young clients relative to the same clients previously audited by Ernst and Whinney² and the 1990 merger increased the Coopers and Lybrand fee premium over Deloitte.³ The 1997 merger reduced the size of the nominal fee discount offered by Price Waterhouse relative to Coopers and Lybrand. Up to the end of our sample period the 2002 transaction had no material effect on the nominal audit fees of Deloitte and Andersen former clients. Using inflation adjusted audit fees, we find that Coopers and Lybrand and Ernst and Young clients paid higher real audit fees relative to clients of the benchmark firm (KPMG). On the other hand, Andersen clients paid lower real audit fees in the run up to being forced out of business. This audit firm transaction is significantly different from the others because the Enron debacle left a stigma not present in other mergers.

The remainder of this paper is organised as follows. The next section reviews the extant literature. Section 3 outlines the research design. The data collection procedures are explained in Section 4. The results are presented in Section 5 and a summary is provided in Section 6.

2. Prior research

Industrial economists argue that market structure is intrinsically linked to firm behaviour and finan-

² The UK combination between Arthur Young and Ernst and Whinney on 1 September 1989 was officially a merger but was seen by some writers as a takeover by Ernst and Whinney because several of the previously high-ranking Arthur Young partners left the following year. This anecdotal evidence suggests that Ernst and Whinney had a stronger brand name reputation than Arthur Young (supporting the evidence of the fee regressions).

³ The Deloitte case provides an exclusive opportunity to examine the effects of brand name. In July 1989, the US partners of Deloitte Haskins & Sells and those of Touche Ross suggested a merger. Deloitte in the UK and Haskins & Sells in the US had very different attitudes to this proposal. The US Deloitte partners overwhelmingly voted to proceed with the merger whereas the UK Deloitte partners chose to merge with Coopers and Lybrand with the official fusion to Coopers and Lybrand Deloitte taking place on 29 April 1990. The potential for confusion caused by two firms signing off as Deloitte was eased on 1 June 1992 when Coopers and Lybrand Deloitte dropped the name Deloitte, becoming Coopers and Lybrand. Coopers allowed Touche Ross to acquire the name Deloitte in 1996 to form Deloitte and Touche (Moizer, 2005: 4).

cial performance (Scherer and Ross, 1990; Martin, 1994). Scholars urge regulators to be wary of the pricing effects of merger-induced increases in market concentration (Stigler, 1968: 30; Gist and Michaels, 1995: 233; Romeo, 1999: 62).⁴ There is considerable evidence that audit market concentration has increased over time in the UK (Briston and Kedslie, 1984; Moizer and Turley, 1989; Beattie and Fearnley, 1994; Pong, 1999) and in other countries (Zeff and Fossum, 1967; Rhode et al., 1974; Hermanson et al., 1987; Wolk et al., 2001). Beattie and Fearnley (1994: 308) contend that, 'auditor concentration in the UK market for listed audit services has now almost reached the limit of a tight oligopoly, which is a market structure characterised by few rivals, stable market shares and medium to high entry barriers'. Concentration levels increased further following the PricewaterhouseCoopers merger and the demise of Andersen. The Sarbanes-Oxley Act (2002), the recommendations of the Treasury Committee (2002) and the Coordinating Group on Audit and Accounting Issues (2003) indicate the extent of the concerns about the audit services market in both the US and UK (Beattie et al., 2003: 251).

The extant literature on the effect of mergers on the economy is mixed (Francis et al., 1999). Consumer welfare will increase if mergers reduce marginal costs, create efficiencies and enhance product differentiation but will decrease if mergers enable tacit collusion over prices or if unilateral anticompetitive effects arise from non-tacit price collusion (Sullivan, 2002: 381–384). Concerns about the welfare implications of the 1989–1990 mergers (Wootton et al. 1994: 58–59) were quietened by the lack of opposition from the Monopolies and Mergers Commission and the Office of Fair Trading in the UK and the Department of Justice in the USA, and by evidence that auditors significantly cut fees to win audits in the 1980s (Simunic, 1980; Francis and Simon, 1987; Simon and Francis, 1988; Pong and Whittington, 1994; Gregory and Collier, 1996).⁵ Although Pong (2004) documents a 17.5% reduction in inflation-adjusted UK audit fees from 1991 to 1995, there has been little recent work that

has addressed this issue. This lack of evidence, and the structural changes resulting from the PricewaterhouseCoopers merger and the demise of Andersen, have rekindled concerns about the competitiveness of the audit market (Hermanson et al., 1987; Gist and Michaels, 1995; Pong, 1998; Willekens and Achmadi, 2003) and worries that that consumer choice will be further impaired if further mergers or takeovers occur (Oxera Consulting Limited, 2006).

It is difficult to test the welfare effects of mergers because audit firms have traditionally been organised as unlimited liability partnerships. This makes access to proprietary data on costs and profitability impossible. Researchers have tried to circumvent this problem by examining audit fees before and after a combination, but the results have been mixed. Tai and Kwong (1997) analysed audit fees using Hong Kong data between 1988 and 1991. They found that real audit fees increased significantly over this period. Ivancevich and Zardkoohi (2000) compared accounting fundamentals for four US audit firms involved in the 1989–1990 mergers against competitor firms that were not involved in mergers. Following the mergers, the market share and audit fees of the merged firms fell relative to their non-merging rivals. Menon and Williams (2001) examined US audit fees for international accounting firm clients between 1980 and 1997. They document a significant positive effect on audit fees for three years after mergers (1991–1993), but this premium subsequently disappears. Iyer and Iyer (1996) compared the UK audit fees earned by Big Eight firms in 1987 with Big Six firms in 1991. Although concentration levels increased over the period, there was no evidence of any associated significant increase in audit fees. Firth and Lau (2004) examine the effect of accounting firm mergers on audit fees using a sample of Hong Kong companies. Their paper investigates the effect of a merger on any audit fee premium that existed before the combination. They find that the size of the premium earned by a brand name firm (Deloitte, Touche Tohmatsu) over a non-brand name firm (Kwan Wong Tan and Fong) fell from 55% before the merger to 34% shortly after the merger. In contrast, there was no change in the audit fee premium earned by two brand name firms (Price Waterhouse and Coopers and Lybrand) after the merger. These results suggest that pre-merger premiums of the brand name auditor pass to the other auditor after a merger but do not transfer for re-branding amongst international firms.

3. Research design

The present study contributes to this literature by investigating the effects of the 1989–1990 Big Six mergers, the 1997 merger between Price

⁴ Moizer and Turley (1989: 41) define concentration as 'the extent to which a relatively small number of audit firms account for a significant proportion of the total audit work carried out.'

⁵ Opinion surveys have yielded results consistent with this research. One survey by the City Research Group found that 81% of the financial executives surveyed by the City Research Group questioning the audit fee (Anonymous, December 1991: 11). Another survey showed that 61% of the accountant respondents thought that 'discounting audit fees was widespread' (Lea, 1991). The leaked Price Waterhouse tender that allegedly included a £900,000 discount was also the subject of press comment (Plender, 1991).

Waterhouse and Coopers and Lybrand and the 2002 Deloitte-Andersen transaction on audit pricing in the UK. We start our analysis by estimating concentration ratios to assess the potential for monopoly pricing in the audit market. Consistent with prior work, we define audit activity based on the number of audit clients each audit firm has and the firm's audit fee revenue (Wootton et. al., 1994; Pong, 1998, 1999; Wolk et. al., 2001). We use the concentration ratio (CR) and Herfindahl Index (H)⁶ because these are widely used by academics and regulators such as the US Department of Justice (Utton, 1970; Briston and Kedsle, 1984; Moizer and Turley, 1989; Beattie and Fearnley, 1994; Pong, 1999). CR and H are descriptive statistics that prima facie suggest whether one should be concerned about the potential for anti-competitive pricing in the audit market. A positive result leads us to investigate whether the UK audit market has become more monopolistic following the accounting firm mergers. Our analysis focuses on the mergers between international accounting firms because these combinations are fewer in number and are likely to have a larger impact on market structure and conduct than those taking place between smaller firms.

3.1 Empirical questions

The central issue is the effect of the big firm mergers on audit pricing, which we sum up in the following question:

EQ1: What are the fee effects for clients of large audit firms following mergers?

Mergers can improve consumer welfare by creating efficiencies or decrease consumer welfare by creating conditions conducive to monopoly pricing (Sullivan, 2002: 381–384). Simunic (1980) argues that some segments of the market could be more competitive than others; this could have an impact on the effects of the mergers on audit pricing. We follow this line of thought by using the small client market as the competitive benchmark and investigating whether fees change around the time of the mergers. In other words, we test whether the mergers have enabled the brand name firms to pass on any cost savings associated with efficiencies to their clients in the form of a reduction in the assumed audit fee premium or allowed the Big Firms to use their power or reputation to increase the audit fee premium. This empirical question is tested by running a quality differentiation regression across sub-samples of clients partitioned by total assets in the periods surrounding the combinations:⁷

$$LAF_i = \alpha_{1,0} + \beta_{1,1} \text{Controls}_i + \beta_{1,2} \text{Brand}_i + \varepsilon_{1,i}, \quad (1)$$

where LAF is the natural logarithm of total audit fees (£000); Brand_i is an indicator variable set equal to one if the auditor is a brand name firm and

zero otherwise; Controls is a vector of control variables capturing audit fee determinants identified in the prior literature (e.g. Francis and Simon, 1987; Simon and Francis, 1988; Beatty, 1993; Anderson and Zeghal, 1994) as follows: LTA = natural logarithm of total assets (£m); Sub = square root of the number of subsidiaries; Current = ratio of current assets to current liabilities; Loss = 1 if an operating loss was reported in any 1 of the prior 3 years, 0 otherwise; Quick = ratio of current assets less stock to current liabilities; DTA = ratio of long-term debt to total assets; ROI = ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; YE = 1 if the accounting year end is between December and March inclusive, 0 otherwise; and $\varepsilon_{1,i}$ is the regression residual. The control variables are designed to capture effort-related variation in audit fees (LTA), litigation risk (DTA, ROI, Current and Quick) and complexity (Sub, Foreign).

The second issue we address concerns the effects of a merger on audit fees charged by specific audit firms around the time of the merger. There is a considerable body of theory and evidence suggesting that the large accounting firms have differentiated themselves from smaller competitors on the basis of perceptions of quality and that they are able to attract premium fees for their investment in a brand name reputation (e.g. Francis and Simon, 1987; Simon and Francis, 1988; Beatty, 1993;

⁶ The CR measures the percentage of the total activity (e.g. number of clients or size of audit fees) that is accounted for by the largest firms as follows:

$$CR_n = \sum_{i=1}^n S_i$$

where n is the number of large audit firms and S_i is the size of audit firm i as a percentage of the size of the market. This study uses the N-firm concentration ratio (CR_n) to examine the dominance of the eight (1985–1989), six (1990–1996), five (1997–1999) and four (2000–2002) largest accounting firms over medium and small firms. Consistent with prior studies (Briston and Kedsle, 1984; Moizer and Turley, 1989; Beattie and Fearnley, 1994; Pong, 1999), we also use the four-firm concentration ratio (CR4) to express the percentage of the total activity that is accounted for by the leading four firms in the market.

One limitation of these measures is that they pay little attention to the number and size of other firms in the market. The Herfindahl Index (H) provides a more comprehensive measure (Utton, 1970: 35–51; Moizer and Turley, 1989: 44; Pong, 1999: 455):

$$H = \sum_{i=1}^M S_i^2$$

where, M is the total number of (big and small) firms in the audit market and S_i is the size of audit firm i as a percentage of the size of the entire market.

⁷ The first subscript, 1, in equation (1) signifies that the regression is based on equation (1), the second subscript, i, refers to firm-year.

McMeeking et al., 2006). A possible motive for smaller accounting firms to merge with larger ones is that it is expected that the clients of the smaller partner will be willing to pay more because of perceptions that the quality of the service provided will have increased as a result of the merger. This is most likely to take place when the disparity in size is marked. However, an interesting question is whether it also arises when both merger parties are large. In such circumstances, fees may rise due to market forces or product differentiation or fall due to economies of scale and/or scope (Francis, et. al., 1999). This leads us to our second research question:

EQ2: What are the fee effects for clients of audit firms merging with larger audit firms?

We test EQ2 in two ways. First, we run panel audit fee regressions for the sub-sample of companies whose auditors were involved in mergers. Following Firth and Lau (2004), we examine audit pricing over three time intervals: three years before the merger; the year of the merger, and three years subsequent to the merger. For the first three mergers, we also examine pricing over different event windows because the choice of appropriate window is not obvious, *a priori*. For the Deloitte-Andersen transaction, in 2002 we use only one post-transaction observation because of the lack of available data at the time of collection. Audit fee differences between the combining firms are captured using a series of dummy variables.

To capture audit fee variation for the Arthur Young and Ernst and Whinney merger in 1989, we restrict our sample to Arthur Young, Ernst and Whinney, and Ernst and Young clients. In other words, an auditee must have been *both* a post-merger client of Ernst and Young and also a pre-merger client of *either* Arthur Young or Ernst and Whinney.⁸ Similarly, to model audit fee variation for the Coopers and Lybrand and Deloitte, Haskins and Sells 1990 merger, we restrict our sample to Coopers and Lybrand, Deloitte, Haskins and Sells and Coopers and Lybrand Deloitte clients. To be included in the sample, a company must have been both a pre-merger client of Deloitte, Haskins and Sells or Coopers and Lybrand and a post-merger client of Coopers and Lybrand Deloitte. To capture audit fee variation for the Price Waterhouse and Coopers and Lybrand 1997 merger, we restrict our

sample to Price Waterhouse, Coopers and Lybrand and PricewaterhouseCoopers clients, with sample firms having to be both pre- and post-merger clients of these firms. Finally, for the Deloitte-Andersen 2002 transaction, we restrict our sample to clients that before the transaction were audited by either Deloitte and Touche or Andersen and afterwards by the new Deloitte firm.

Based on the research design in Firth and Lau (2004), we use the following generic regression model to test how audit prices were affected by merger activity:

$$\begin{aligned} LAF_i = & \alpha_{2,0} + \beta_{2,1}EWpre_i + \beta_{2,2}PostEY_i \\ & + \beta_{2,3}EYmerge_i + \beta_{2,4}CLpre_i + \beta_{2,5}PostCLD_i \\ & + \beta_{2,6}CLDmerge_i + \beta_{2,7}PWpre_i \\ & + \beta_{2,8}PostPWC_i + \beta_{2,9}PWCmerge_i \\ & + \beta_{2,10}DTpre_i + \beta_{2,11}PostD_i + \beta_{2,12}Dmerge_i \\ & + \beta_{2,13}Controls_i + \varepsilon_{2,i} \end{aligned} \quad (2)$$

As before, LAF is the natural logarithm of total audit fees (£000) and includes both pre- and post-merger observations; EWpre, PostEY, EYmerge, CLpre, PostCLD, CLDmerge, PWpre, PostPWC, PWCmerge, DTpre, PostD and Dmerge are dichotomous treatment variables. EWpre is set equal to 1 if the observation is prior to the merger and the auditor is Ernst and Whinney; if the auditor prior to the merger is Arthur Young or the observation is after the merger then EWpre is 0. PostEY is set equal to 1 for a post-merger observation and 0 otherwise. EYmerge is set equal to 1 for a post-merger observation where the client was originally audited by Ernst and Whinney and 0 otherwise. CLpre is set equal to 1 if the observation is prior to the merger and the auditor at that time is Coopers and Lybrand and 0 otherwise. PostCLD is set equal to 1 for a post-merger observation and 0 otherwise. CLDmerge is set equal to 1 if the observation is after the merger and the original auditor was Coopers and Lybrand and zero otherwise. PWpre is set equal to 1 if the observation is prior to the merger and the auditor at that time is Price Waterhouse and 0 otherwise. PostPWC is set equal to 1 for a post-merger observation and 0 otherwise. PWCmerge is set equal to 1 if the observation is after the merger and the original auditor was Price Waterhouse and zero otherwise. DTpre is set equal to 1 if the observation is prior to the transaction and the auditor at that time is Deloitte and Touche and 0 otherwise. PostD is set equal to 1 for a post-transaction observation and 0 otherwise. Finally, Dmerge is set equal to 1 if the observation is after the transaction and the original auditor was Deloitte and Touche and zero otherwise. The first subscript, 2, signifies that the regression is based on equation (2), the second subscript, *i*, refers to firm-year, $\varepsilon_{2,i}$ is the regression residual and Controls is the vector of the same control variables

⁸ We exclude clients of other auditors who switched to the combined Ernst and Young firm after the merger and pre-merger clients of either Arthur Young or Ernst and Whinney who defected to other audit firms. A problem with this design is that we might observe fee cutting by the non-defecting clients caused by their demanding a reward for staying loyal. This does not, however, affect what is of primary interest in our study, namely, the relative changes in the fees of clients of the combining audit firms. As we explain later, our models estimated across the full sample of audit clients circumvent the latter problem.

Table 2
Definitions of the variables used in the real audit-pricing model (4)

<i>Variable</i>	<i>Definition</i>
EWpre	1 if the observation is prior to the merger and Ernst and Whinney are the auditors and Ernst and Young audit the client after the merger, 0 otherwise.
AYpre	1 if the observation is prior to the merger and Arthur Young are the auditors and Ernst and Young audit the client after the merger, 0 otherwise.
EYpost	1 if the auditor prior to the merger is Ernst and Whinney, the observation is after the merger and Ernst and Young audit the client, 0 otherwise.
CLpre	1 if the observation is prior to the merger and Coopers and Lybrand are the auditors and Coopers and Lybrand Deloitte audit the client after the merger, 0 otherwise.
DHSpre	1 if the observation is prior to the merger and Deloitte, Haskins and Sells are the auditors and Coopers and Lybrand Deloitte audit the client after the merger, 0 otherwise.
CLpost	1 if the auditor prior to the merger is Coopers and Lybrand, the observation is after the merger and Coopers and Lybrand Deloitte audit the client, 0 otherwise.
PWpre	1 if the observation is prior to the merger and Price Waterhouse are the auditors and PricewaterhouseCoopers audit the client after the merger, 0 otherwise.
Cpre	1 if the observation is prior to the merger and Coopers and Lybrand are the auditors and PricewaterhouseCoopers audit the client after the merger, 0 otherwise.
PWCpost	1 if the auditor prior to the merger is Price Waterhouse, the observation is after the merger and PricewaterhouseCoopers audit the client, 0 otherwise.
Dpre	1 if the observation is prior to the transaction and Deloitte and Touche are the auditors and Deloitte audit the client after the transaction, 0 otherwise.
Apre	1 if the observation is prior to the transaction and Andersen are the auditors and Deloitte audit the client after the transaction, 0 otherwise.
Dpost	1 if the auditor prior to the transaction is Deloitte and Touche, the observation is after the transaction and Deloitte audits the client, 0 otherwise.
NBF	1 if a non brand-name firm audits the client, 0 otherwise.

as specified for model 1.

The logic underlying this research design is as follows. A positive $\beta_{2,1}$ coefficient captures any premium that Ernst and Whinney earned over Arthur Young prior to the merger. A positive $\beta_{2,2}$ coefficient indicates the increase in fees experienced by Arthur Young clients following the merger and $\beta_{2,2} + \beta_{2,3}$ is the corresponding increase for Ernst and Whinney clients. Thus a positive $\beta_{2,3}$ coefficient captures the additional post-merger premium paid by clients originally audited by Ernst and Whinney. Similarly, a positive $\beta_{2,4}$ coefficient captures any premium that Coopers and Lybrand earned prior to the merger, a positive $\beta_{2,5}$ coefficient estimates the post-merger premium paid by continuing Deloitte, Haskins and Sells clients and a positive $\beta_{2,6}$ coefficient measures any incremental post-merger premium of the Coopers and Lybrand clients. $\beta_{2,7}$ captures any premium that Price Waterhouse earned prior to the merger, $\beta_{2,8}$ the post-merger premium paid by continuing Coopers and Lybrand clients

and $\beta_{2,9}$ any incremental post-merger premium of the Price Waterhouse clients. $\beta_{2,10}$ captures any premium that Deloitte and Touche earned prior to the transaction, $\beta_{2,11}$ the post-transaction premium paid by continuing Andersen clients and $\beta_{2,12}$ any incremental post-transaction premium of the Deloitte and Touche clients.

One limitation of the Firth and Lau (2004) methodology is that merger-induced audit fee changes cannot be distinguished from fee variations across the entire audit market. We circumvent this problem by investigating audit pricing for the clients of the firms involved in the four mergers and those that were excluded from merger activity. We do this by running a pooled model that contains the previous control variables, a non-brand name firm dummy and dichotomous variables indicating whether the observations relate to a firm that was involved in the mergers. The advantages of this design is that it controls for omitted factors that might confound the results and allows one to see how any merger-related premium varies vis-à-vis the firm

that was not involved in merger activity with one of its international counterparts (KPMG). One problem with running a pooled estimation across the extended (1985–2002) time frame is that audit fees may increase significantly due to the effects of general price inflation. Following Pong (2004), we account for inflationary driven audit fee changes using measures of the retail price index to adjust the nominal audit fees into real audit fees based on the month of the company's financial year-end. Differences in real audit fees are captured using the following model:

$$\begin{aligned} LRAF_i = & \alpha_{3,0} + \beta_{3,1}EWpre_i + \beta_{3,2}AYpre_i \\ & + \beta_{3,3}EYpost_i + \beta_{3,4}CLpre_i + \beta_{3,5}DHSpre_i \\ & + \beta_{3,6}CLDpost_i + \beta_{3,7}PWpre_i \\ & + \beta_{3,8}Cpre_i + \beta_{3,9}PWCpost_i \\ & + \beta_{3,10}Dpre_i + \beta_{3,11}Apre_i + \beta_{3,12}DPost_i \\ & + \beta_{3,13}NBF + \beta_{3,14}Controls_i + \varepsilon_{3,i} \end{aligned} \quad (3)$$

LRAF is the natural logarithm of real (inflation adjusted) audit fees (£000) and other variables are as defined before (see Table 2).

4. Data collection

The data were taken from a population of 1,596 UK companies listed on both the London Stock Exchange and the Standard and Poor's *Global Vantage* database. Our final sample consists of a wide range of clients that reported data on the *Global Vantage*, *Thomson Analytics Worldscope Datastream International*, *Extel Company Research* databases and the *International Stock Exchange Yearbook*. Data on total assets, debt, earnings before interest and tax, financial year-end, quick ratio, current ratio, operating profit and industry listing code data were collected for the period 1985–2002 from the *Global Vantage* and *Thomson Analytics Worldscope* databases. Audit data were collated from the *Datastream International*, *Extel Company Research* and *Thomson Analytics Worldscope* databases. Subsidiary and auditor identity data were hand collected from hard copies of the *International Stock Exchange Yearbook* and published annual reports. We eliminated financial firms from the analysis because of lack of comparability with non-financial firms' financial statements and because the cost structure of audits in financial firms differs significantly from those of industrials. Extreme observations in the top and bottom percentiles of total assets, total debt, operating profit, pre-tax profits, earnings before interest and tax and audit fees were eliminated from the sample.⁹ The final sample comprises 7,255 firm-year observations covering the period 1985–2002.

Consistent with other studies, the models include logarithmic or square root transformations of the value of audit fees, total assets and sub-

sidaries variables, as appropriate. This mitigates the possibility that large auditees will dominate the results. Table 3 presents descriptive statistics and shows how these transformation procedures reduced the extent of skewness in the distribution of the assets, debt and earnings variables.

Untabulated Pearson correlation coefficients are mostly insignificant. In relation to the explanatory variables, the correlation coefficients between Current and Quick (0.69) and between LTA and Sub (0.59) are the only ones of any magnitude. However, untabulated variance inflation factors were all lower than the conventional cut-off point of 10, suggesting that it is unlikely that multicollinearity materially affects our findings.

5. Results

5.1. Descriptive statistics

Market share estimates based on the number of audit clients (CR_n, CR4 and H) from 1985 to 2002 are reported in Table 4. Between 1985 and 2002, CR_n increased from 65% to 83%, CR4 from 45% to 80% and H from 13% to 22% based on the number of audit clients. Using the audit fee as a measurement basis, CR_n increased from 77% to 95%, CR4 from 59% to 88% and H from 13% to 23% over the same period.

As a basis of comparison, the Herfindahl findings for 2002 are equivalent to a market of just over four firms of equal size and are even larger than the levels identified in the prior UK literature (9.6%, Moizer and Turley, 1989: 45; 16.97%, Pong, 1999: 472) as signifying a tight oligopolistic market structure.¹⁰ Concentration ratios increased rapidly around the time of the Big Firm mergers and reached levels in 2002 that suggest that the potential for price collusion is high. Unreported auditor market shares across four quartiles defined by client size indicate that concentration is an increasing function of client size. The high and increasing levels of concentration based on numbers of audit clients and on fee revenues suggest that the potential for price collusion is particularly high in the largest client segment. The issue we turn to next is the impact this industry consolidation had on the relative rankings of audit firms.

Rankings of the audit firms based on estimated

⁹ However, the key results are not materially different regardless of whether the extreme observations are Winsorised or included in the sample.

¹⁰ We use the Parker (1991) methodology to compare the observed concentration ratios with their corresponding critical concentration ratios. Consistent with Willekens and Achmadi (2003: 441), we compute the 5% critical levels to determine whether the market is significantly concentrated. We find that statistically significant concentration ratios are observed for CR_n in 1988 and from 1992–1998 and for CR4 in 1985, 1986, 1988 and 1999–2000.

Table 3
Descriptive statistics for the sample of UK clients

Variable	Mean	St. Dev.	Min	Q1	Median	Q3	Max
Audit fee	359.183	577.308	10	60	130	370	11400
LAF	5.031	1.264	2.267	4.094	4.868	5.914	9.341
Total assets	513.745	1465.451	0.355	40.214	120.365	387.547	22565
LTA	11.722	1.629	5.872	10.525	11.563	12.761	18.846
Subsidiaries	16.847	18.329	0	5	11	22	196
Sub	3.636	1.905	0	2.236	3.317	4.690	14
Total debt	152.751	401.362	0	3.672	15.146	64.400	18800
Op. profit	55.458	203.501	-235.9	3.381	9.933	33.800	4252.000
EBIT	70.874	214.624	-235.9	8.124	13.412	50.145	4120
Revenue	520.145	1267.987	0	54.21	142.875	403.124	15742
LREV	5.575	2.015	-3.863	3.993	4.962	5.999	9.664
Current	1.573	0.815	0.015	1.150	1.431	1.827	8.987
Quick	0.939	0.666	0.012	0.626	0.856	1.114	8.864
DTA	0.100	0.135	0	0.013	0.072	0.147	3.612
ROI	0.098	0.155	-1.345	0.065	0.111	0.152	0.692
Foreign	0.247	0.270	0	0	0.167	0.429	1
Loss	0.157	0.364	0	0	0	0	1
YE	0.691	0.472	0	0	1	1	1

Audit Fee = Fee relating to the audit (£000); LAF = natural logarithm of the audit fee (£000); Total Assets = Total assets (£m); LTA = natural logarithm of total assets (£m); Subsidiaries = Number of domestic subsidiaries; Sub = square root of the number of subsidiaries; Total Debt = Total debt (£m); Op. profit = Operating profit (£m); EBIT = Earnings before interest and tax (£m); Revenue = Total sales revenue (£000); LREV = natural logarithm of total sales revenue (£000); Current = ratio of current assets to current liabilities; Quick = ratio of current assets less stock to current liabilities; DTA = ratio of long-term debt to total assets; ROI = ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; Loss = 1 if an operating loss was reported in any one of the prior three years, 0 otherwise; YE = 1 if the accounting year-end is between December and March, 0 otherwise.

Table 4
Auditor concentration ratios based on (a) the number of audit clients and (b) the fee

Year	Number of large firms	Number of observations	CRs based on number of audit clients			CRs based on audit fee		
			CR _n	CR4	H	CR _n	CR4	H
1985	8	225	0.65	0.45	0.13	0.77	0.59	0.13
1986	8	288	0.65	0.45	0.12	0.77	0.57	0.11
1987	8	358	0.66	0.44	0.11	0.81	0.59	0.13
1988	8	430	0.69	0.48	0.12	0.81	0.59	0.12
1989	7	446	0.71	0.49	0.12	0.81	0.57	0.12
1990	6	473	0.72	0.55	0.13	0.81	0.71	0.14
1991	6	496	0.73	0.56	0.13	0.82	0.72	0.16
1992	6	488	0.76	0.55	0.13	0.88	0.76	0.17
1993	6	488	0.77	0.56	0.14	0.89	0.79	0.18
1994	6	461	0.79	0.58	0.14	0.89	0.78	0.18
1995	6	485	0.80	0.61	0.14	0.90	0.80	0.18
1996	6	442	0.81	0.61	0.16	0.94	0.86	0.22
1997	5	421	0.84	0.61	0.16	0.93	0.86	0.23
1998	5	387	0.84	0.69	0.15	0.96	0.82	0.21
1999	5	361	0.84	0.79	0.21	0.95	0.88	0.28
2000	5	343	0.84	0.78	0.22	0.95	0.87	0.26
2001	5	354	0.83	0.76	0.20	0.94	0.85	0.24
2002	4	309	0.83	0.80	0.22	0.95	0.88	0.23

The table shows the number of large accounting firms and the mean values of the n firm concentration ratio, the four firm concentration ratio and Herfindahl index based on the number of audit clients and the fees relating to the audit of the accounting firms. The table documents concentration ratios from 1985 to 2002 (7,255 observations). The concentration ratio is defined as

$$CR_n = \sum_{i=1}^n S_i, \quad CR4 = \sum_{i=1}^4 S_i$$

and the Herfindahl Index as

$$H = \sum_{i=1}^M S_i^2$$

where n is the number of large audit firms, M is the total number of firms in the market and S_i is the size of audit firm i as a percentage of the size of the market.

Table 5
Audit firm rankings based on UK fees relating to the audit

	AA	EW	AY	EY	CL	DHS	CLD	KPMG	PW	PWC	TR	D
1985	8	5	7		6	2		1	3		4	
1986	8	5	7		6	3		1	2		4	
1987	8	5	7		6	3		1	2		4	
1988	8	5	7		6	3		1	2		4	
1989	8	5	7		6	3		1	2		4	
1990	6			4			2	1	3		5	
1991	6			4			2	1	3		5	
1992	6			4			2	1	3		5	
1993	6			4			2	1	3		5	
1994	6			4			2	1	3		5	
1995	6			4			2	1	3		5	
1996	6			4			2	1	3		5	
1997	6			4			2	1	3		5	
1998	5			3				2		1	4	
1999	5			3				2		1	4	
2000	5			3				2		1	4	
2001	5			3				2		1	4	
2002				4				2		1		3

The table shows the rankings of the large accounting firms based on the fees relating to the audit from 1985 to 2002. Firms are defined using their UK names in the year in question.

AA: Andersen (including its previous depiction of Arthur Andersen).

EW: Ernst and Whinney.

AY: Arthur Young.

EY: Ernst and Young (created by the merger of Arthur Young and Ernst and Whinney).

CL: Coopers and Lybrand.

DHS: Deloitte Haskins and Sells.

CLD: Coopers and Lybrand (created by the merger of Coopers and Lybrand with Deloitte Haskins and Sells).

KPMG: KPMG (including its previous depictions such as Peat Marwick).

PW: Price Waterhouse.

PWC: PricewaterhouseCoopers (created by the merger of Price Waterhouse with Coopers and Lybrand).

TR: Touche Ross.

D: Deloitte (created when the majority of Andersen's clients were subsumed into the firm Deloitte and Touche).

market share of audit fees are reported in Table 5. The leading four firms in 1985 were Peat Marwick, Deloitte Haskins and Sells, Price Waterhouse and Touche Ross. Consistent with Moizer (2005), we find that Deloitte Haskins and Sells and Ernst and Whinney had larger market shares than Coopers and Lybrand and Arthur Young respectively in 1987 and the Big Six mergers increased the market share of the merging firms to produce a new top four of KPMG, Coopers and Lybrand, Price Waterhouse and Ernst and Young. A substantial increase in market share of PricewaterhouseCoopers following the 1997 merger helped that firm to become the leading audit firm. The Andersen transaction resulted in a revised top four comprising PricewaterhouseCoopers, KPMG, Deloitte and Ernst and Young.

5.2 Monopolistic or competitive pricing

We now turn our attention to the effect industry restructuring had on the pricing of audit services.

The mean parameter estimates and t-statistics taken from the cross-section regressions are documented in the following tables for the areas of interest. The t-statistics are estimated using the White (1980) procedure because there is some evidence of heteroskedasticity. We show in bold type the coefficients that are significant at the 5% level or better. In all of the regressions, the models are significant at the $p < 0.01$ level, exhibit strong explanatory power (R^2 generally around 70%), and the control variables possess the anticipated signs and are significant at the $p < 0.05$ level (except Loss and ROI, which are sometimes insignificant).

Since concentration levels appear to have reached record levels by the end of the sample period, we investigate whether the mergers resulted in the Big Firms charging higher audit fees than their smaller counterparts and if so whether this is due to product differentiation or monopolistic pricing. Evidence that the audit firms were charging

premium fees in a saturated market segment would be of interest to regulators, because this might be a sign of anti-competitive pricing policies. We first address this possibility by running model 1 across sub-samples partitioned across the quartile values of the size of the client for the years of the Big Firm mergers and each of the sub-periods where there were eight, six, five and four dominant accounting firms. The results of these estimations are presented in Table 6.

The brand name premium is statistically significant in 1985–1988 for most partitions and bigger for the two largest audit client quartiles, consistent with larger clients being willing to pay more for auditor reputation in this period. This pattern breaks down following the mergers in subsequent periods. The brand name premium is statistically significant for clients in the smallest quartile (the competitive benchmark) in 1985–1989 (17.4%) 1991–1996 (8.8%) and 1998–2001 (29.7%). The brand name premium is insignificant for clients in the smallest quartile in 1989–1990 and 1997 and is significant and negative in 2002 (consistent with a highly competitive market). Similarly, for companies in the second largest quartile, significant brand name returns are observed in 1985–1988 (11.5%), 1989–1990 (23.0%), 1991–1996 (22.2%), 1998–2001 (39.8%) and 2002 (87.8%). Significant brand name returns are observed for the subsample of companies in the third largest quartile in 1985–1988 (20.8%) and 1991–1996 (25.8%). For the largest quartile of companies, the brand name premium is statistically significant for 1985–1988 (37.1%) and 1991–1996 (32.6%). The statistically significant negative coefficients on Brand indicate that the audit fees paid to the Big Firms by the largest quartile of clients were significantly lower than those paid to their smaller counterparts in 1998–2001 (37.3%) and 2002 (53.6%).

If audit firms were engaging in anti-competitive pricing strategies, we would expect to see the strongest growth in brand name premia following mergers amongst client groups most willing to pay for reputation. Our mixed results in relation to client size suggest that willingness to pay a brand premium is not an increasing function of client size. Our findings indicate that subsequent to the Big Six mergers, the brand name premium increases for mid-sized clients (i.e. those in the second and third size quartiles) but falls in the quartiles containing the smallest (competitive benchmark) and largest companies. The brand name premium also increases for clients of below median size and falls for above-average sized clients following the PricewaterhouseCoopers merger. The picture is even more complex following the Deloitte-Andersen transaction, where the premium falls for the smallest and largest client quartiles but increases for those in the second quartile. Following the

combinations, the brand name premium increases for companies in the second quartile but is volatile for all other quartiles. This pattern of results appears to be more consistent with the explanation that audit firms engage in product differentiation rather than anti-competitive pricing strategies. In other words, price increases occurred only where the mergers enabled the Big Firms to create new products or services that were more appealing to particular segments of the audit market. Our results suggest that such market segmentation is only loosely related to the size of the client.

5.3 *The effect of mergers on audit fees*

The results obtained by estimating equation (2) for the restricted sample of audit clients of firms involved in mergers three years before, the year of and three years¹¹ subsequent to the combinations are documented in Table 7. These regressions are all significant at $p < 0.01$, have strong explanatory power (R^2 of 81%–85%) and the control variables exhibit the expected signs. The results reported in the third column of Table 7 are estimated using the sub-sample of 350 client-year observations relating to audits conducted by either Arthur Young or Ernst and Whinney before the merger, and by the new Ernst and Young firm after the merger. The coefficient of 0.148 on PostEY is positive and significant ($p < 0.05$), consistent with Arthur Young clients paying a fee increase of the order of 16% after the merger. EYmerge is negative but insignificant, suggesting little or no change in the audit fees of former Ernst and Whinney clients after the merger. EWpre is positive but not statistically significant, suggesting no systematic difference in audit fees paid by Ernst and Whinney clients from those paid by the clients of Arthur Young prior to the merger. These findings suggest that the merger eliminated the audit fee premium of Ernst and Whinney over Arthur Young. The results are consistent with Baskerville and Hay's (2006) argument that the combination was effectively a takeover by the larger firm (Ernst and Whinney in the UK), and with the proposition that the merger improved the reputation of Arthur Young based on the rankings reported in Table 5 and in Moizer (2005).

The results reported in the fourth column of Table 7 are estimated using the sub-sample of 532 client-year observations relating to audits conducted by Coopers and Lybrand or Deloitte, Haskins and Sells before the merger, and by the new Coopers and Lybrand Deloitte firm after the merger. The coefficient on CLpre is not statistically significant, a finding consistent with Cooper and Lybrand clients and Deloitte, Haskins and Sells

¹¹ One year for the Deloitte combination, due to a lack of data.

Table 6
OLS regression models of log fees against brand name dummies for sub samples partitioned by client size in the pre- and post-merger periods surrounding the mergers

$LAF = \alpha_{1,0} + \beta_{1,1} \text{Controls} + \beta_{1,2} \text{Brand} + \epsilon_{1,i} \quad (1)$

Years / State of market
Sub-sample

	1985-1988 / Eight Big Firms		
	Smallest	Second	Third
LTA	LTA<10.525	10.524<LTA<=11.563	11.563<LTA<=12.761
Brand	0.160 (2.66)	0.109 (1.73)	0.189 (2.22)
Premium	0.174 (2.49)	0.115 (1.73)	0.208 (2.49)
N	325	325	325
F	25.53 ^a	31.84 ^a	20.66 ^a
Adj R ²	0.70	0.71	0.70

Years / State of market
Sub-sample

	1989-1990 / Big Six Mergers		
	Smallest	Second	Third
LTA	LTA<10.525	10.524<LTA<=11.563	11.563<LTA<=12.761
Brand	0.084 (1.21)	0.206 (2.91)	0.091 (0.80)
Premium	0.088 (1.21)	0.230 (2.91)	0.095 (0.80)
N	229	230	230
F	23.57 ^a	26.90 ^a	11.50 ^a
Adj R ²	0.75	0.82	0.58

Years / State of market
Sub-sample

	1991-1996 / Six Big Firms		
	Smallest	Second	Third
LTA	LTA<10.525	10.524<LTA<=11.563	11.563<LTA<=12.761
Brand	0.084 (2.24)	0.206 (4.39)	0.229 (3.50)
Premium	0.088 (2.24)	0.222 (4.39)	0.258 (3.50)
N	715	715	715
F	88.69 ^a	66.64 ^a	48.71 ^a
Adj R ²	0.81	0.80	0.72

^a significant at the 1% level. The coefficients shown in bold are significant at the 5% level or lower.
The dependent variable is the natural logarithm of audit fees.
The first row shows the parameter estimate and the second row the t-statistic (two-tailed) for each variable. The expected sign is positive.
Brand = 1 if Big Firm auditor, 0 otherwise.

Table 6
OLS regression models of log fees against brand name dummies for sub samples partitioned by client size in the pre- and post-merger periods surrounding the mergers (continued)

$LAF = \alpha_{1,0} + \beta_{1,1}Controls + \beta_{1,2}Brand + \varepsilon_{1,i} \quad (1)$

Year / State of market Sub-sample	Smallest	Second	Third	Largest
1997 / PwC Merger				
LTA	LTA<10.525	10.524<LTA<=11.563	11.563<LTA<=12.761	LTA>12.761
Brand	0.115 (0.86)	0.002 (0.01)	0.175 (0.65)	0.097 (0.27)
Premium	0.123	0.012	0.192	0.102
N	105	105	106	105
F	19.54 ^a	12.57 ^a	28.71 ^a	13.51 ^a
Adj R ²	0.88	0.70	0.72	0.84
1998–2001 / Five Big Firms				
Years / State of market Sub-sample	Smallest	Second	Third	Largest
LTA	LTA<10.525	10.524<LTA<=11.563	11.563<LTA<=12.761	LTA>12.761
Brand	0.260 (3.14)	0.334 (3.63)	0.053 (0.49)	-0.467 (2.60)
Premium	0.297	0.398	0.055	-0.373
N	361	361	361	362
F	13.99 ^a	17.14 ^a	20.01 ^a	56.12 ^a
Adj R ²	0.67	0.74	0.76	0.86
2002 / Andersen transaction				
Year / State of market Sub-sample	Smallest	Second	Third	Largest
LTA	LTA<10.525	10.524<LTA<=11.563	11.563<LTA<=12.761	LTA>12.761
Brand	-0.383 (1.01)	0.761 (2.50)	0.515 (0.88)	-0.768 (2.55)
Premium	-0.318	0.878	0.674	-0.536
N	77	77	77	78
F	13.19 ^a	16.41 ^a	11.71 ^a	16.65 ^a
Adj R ²	0.88	0.83	0.74	0.88

^a significant at the 1% level. The coefficients shown in bold are significant at the 5% level or lower.
The dependent variable is the natural logarithm of audit fees.
The first row shows the parameter estimate and the second row the t-statistic (two-tailed) for each variable. The expected sign is positive.
Brand = 1 if Big Firm auditor, 0 otherwise.

clients paying similar fees before the merger. The coefficient on PostCLD is also not statistically significant, implying that the clients of Deloitte, Haskins and Sells did not suffer a fee increase after the merger. However, the coefficient for CLDmerge is positive and significant ($p < 0.01$) and converts to a 14% post-merger premium paid by Cooper and Lybrand clients. We interpret this as evidence that the brand name reputation of Coopers and Lybrand increased after the merger. This interpretation is consistent with Table 5 and the Moizer (2005) rankings of Deloitte, Haskins and Sells and Coopers and Lybrand.

The results documented in the fifth column of Table 7 are estimated using the sub-sample of 978 client-year observations relating to audits conducted by Price Waterhouse or Coopers and Lybrand before the merger and by the new PricewaterhouseCoopers firm after the merger. PWpre is negative and significant at $p < 0.05$, suggesting that Price Waterhouse clients paid less for audit services than clients of Coopers and Lybrand before the merger. The coefficient of -0.078 corresponds to a 7.8% discount. The coefficient on PostPWC is not significant, indicating that Coopers and Lybrand clients did not suffer a post-merger fee increase. PWCmerge is not statistically significant, consistent with Price Waterhouse clients not paying more than did Coopers and Lybrand clients after the merger. These results suggest that the merger eliminated the significant discount offered to Price Waterhouse clients relative to Coopers and Lybrand clients. Consistent with the rankings documented in Moizer (2005) and Table 5, these findings suggest that the reputation of Price Waterhouse increased relative to Coopers and Lybrand when Price Waterhouse merged with the larger firm.

The results presented in the final column of Table 7 are estimated using a sub-sample of 117 client-year observations relating to audits conducted by Deloitte and Touche or Andersen before the transaction and by the new Deloitte firm after the transaction. For this combination, we modelled audit fees one year preceding and one year after the transaction because of the lack of availability of more recent data at the time of collection. Dmerge, DTpre and PostD are not significantly different from zero. Subject to the aforementioned caveat, this transaction does not seem to have had any material audit pricing effects. The two firms seem to have been on a similar footing prior to the transaction. The finding that the Dmerge coefficient is also insignificant suggests that Deloitte and Touche's reputation did not suffer as a result of the Andersen transaction.

Finally, the results of our OLS merger estimation using inflation adjusted variables for the full sample of audit clients (model 3) are documented

in Table 8. This regression is highly significant ($p < 0.01$), has strong explanatory power (adjusted R^2 of 80%) and the control variables exhibit the expected signs. The coefficient of -0.165 for the NBF variable is significant at $p < 0.05$, consistent with audit clients receiving a 15% discount relative to the benchmark firm (KPMG). The coefficient of 0.125 for the EYpost variable is statistically significant at $p < 0.05$, consistent with Ernst and Young clients accepting a 13% increase in fees after the merger vis-à-vis the benchmark firm. The coefficient of 0.143 for the CLpost variable is statistically significant ($p < 0.01$), implying that the clients of Coopers and Lybrand accepted a 15% fee increase after the merger. The coefficient of -0.108 for the Apre variable is significant at $p < 0.05$, suggesting that Andersen clients paid 10% less for audit services than the benchmark firm. These results are consistent with our earlier findings of product differentiation amongst the international accounting firms. The coefficients for the EWpre, AYpre, CLpre, DHSpre, PWpre, Cpre, PWCpost, Dpost and Dpre variables are all insignificant, suggesting that they paid similar audit fees to the benchmark firm.

5.4. Sensitivity checks

A series of sensitivity checks were performed to test the robustness of our findings. The results are not sensitive to the number of accounting firms used to measure concentration or the number of client size partitions created. Estimating model (1) across loss making and non-loss-making sub-samples provides a means of testing the sensitivity of the fee discounting findings to the financial performance of clients. We also sequentially excluded firms from model 1 to test whether one or a group of accounting firms might drive the results. Untabulated results indicate that the findings are not sensitive to client profitability or auditor size. We also varied the event window for model (3) using data for one, two, three and four years before and after the mergers, but results were not materially different. We tested the robustness of our findings to model specification by running the alternative estimations suggested by Firth and Lau (2004). Finally we ran two sets of regressions for the clients of merging firms before the mergers and for the same clients after the mergers. The general finding of these sensitivity checks is that our results are not materially affected by model specification.

6. Summary and conclusions

This paper contributes to the literature by investigating the relationship between market concentration, accounting firm mergers and audit fee levels. We find that concentration ratios increased between 1985 and 2002 to levels that exceed those

Table 7

OLS Audit fee regression models of log fees against dummies for clients of audit firms that have merged over the sub-periods pre- and post- each merger

		<i>EY merger</i>	<i>CLD merger</i>	<i>PwC merger</i>	<i>A transaction</i>
Intercept	?	-1.301 (7.70)	-1.529 (7.87)	-1.001 (7.64)	-1.493 (6.76)
LTA	+	0.468 (33.93)	0.498 (33.48)	0.447 (39.52)	0.512 (25.40)
Sub	+	0.230 (18.30)	0.214 (15.29)	0.218 (21.30)	0.187 (12.53)
Current	-	-0.043 (0.93)	-0.226 (6.81)	-0.222 (8.17)	-0.303 (5.95)
Quick	+	0.075 (1.46)	0.206 (4.78)	0.183 (5.45)	0.363 (5.12)
DTA	+	0.222 (1.91)	0.323 (1.67)	0.011 (0.11)	0.093 (0.38)
ROI	-	-0.094 (0.51)	-0.634 (2.53)	-0.239 (1.67)	-1.085 (5.60)
Foreign	+	0.192 (2.28)	0.287 (3.30)	0.699 (10.93)	0.534 (7.16)
YE	+	0.091 (2.24)	0.157 (3.38)	0.163 (4.98)	0.038 (0.74)
Loss	+	0.101 (1.75)	0.107 (1.65)	0.002 (0.04)	0.108 (1.62)
EYmerge	?	-0.08 (1.66)			
EWpre	?	0.034 (0.53)			
PostEY	?	0.148 (2.47)			
CLDmerge	?		0.131 (2.81)		
CLpre	?		0.016 (0.16)		
PostCLD	?		-0.003 (0.04)		
PWCmerge	?			0.013 (0.39)	
PWpre	?			-0.078 (2.45)	
PostPWC	?			-0.064 (1.17)	
Dmerge	?				0.015 (0.32)
DTpre	?				0.027 (0.52)
PostD	?				-0.02 (0.39)

Table 7

OLS Audit fee regression models of log fees against dummies for clients of audit firms that have merged over the sub-periods pre- and post- each merger (continued)

	<i>EY merger</i>	<i>CLD merger</i>	<i>PwC merger</i>	<i>A transaction</i>
N	350	532	978	117
F	304 ^a	293 ^a	533 ^a	254 ^a
R ²	0.85	0.83	0.81	0.84

Model (2 EY merger):

$$LAF_i = \alpha_{2,0} + \beta_{2,1} EWpre_i + \beta_{2,2} PostEY_i + \beta_{2,3} EYmerge_i + \beta_{2,13} Controls_i + \varepsilon_{2,i}$$

Model (2 CLD merger):

$$LAF_i = \alpha_{2,0} + \beta_{2,4} CLpre_i + \beta_{2,5} PostCLD_i + \beta_{2,6} CLDmerge_i + \beta_{2,13} Controls_i + \varepsilon_{2,i}$$

Model (2 PwC merger):

$$LAF_i = \alpha_{2,0} + \beta_{2,7} PWpre_i + \beta_{2,8} PostPWC_i + \beta_{2,9} PWCmerge_i + \beta_{2,13} Controls_i + \varepsilon_{2,i}$$

Model (2 D-A transaction):

$$LAF_i = \alpha_{2,0} + \beta_{2,10} DTpre_i + \beta_{2,11} PostD_i + \beta_{2,12} Dmerge_i + \beta_{2,13} Controls_i + \varepsilon_{2,i}$$

^a significant at the 1% level. The coefficients shown in bold are significant at the 5% level. The first figure in each panel shows the parameter estimate and the second figure the t-statistic (two-tailed) for each variable. The dependent variable is the natural logarithm of the audit fee. LTA= natural logarithm of total assets (£m); Sub = square root of the number of subsidiaries; Current = ratio of current assets to current liabilities; Quick = ratio of current assets less stock to current liabilities; DTA= ratio of long-term debt to total assets; ROI= ratio of earnings before interest and tax to total assets; Foreign = proportion of subsidiaries that are foreign operations; YE= 1 if the fiscal year-end is between December and March inclusive, 0 otherwise; Loss = 1 if an operating loss was reported in any of the prior three years, 0 otherwise; EWpre = 1 if the observation is prior to the merger and the auditor is Ernst and Whinney, if the auditor prior to the merger is Arthur Young or the observation is after the merger then EWpre is 0; PostEY = 1 for a post-merger observation, 0 otherwise; EYmerge = 1 for a post-merger observation where the client was originally audited by Ernst and Whinney, 0 otherwise; CLpre = 1 if the observation is prior to the merger and the auditor at that time is Coopers and Lybrand, 0 otherwise; PostCLD = 1 for a post-merger observation, 0 otherwise; CLDmerge = 1 if the observation is after the merger and the original auditor was Coopers and Lybrand, 0 otherwise; PWpre = 1 if the observation is prior to the merger and the auditor at that time is Price Waterhouse, 0 otherwise; PostPWC = 1 for a post-merger observation, 0 otherwise; PWCmerge = 1 if the observation is after the merger and the original auditor was Price Waterhouse, 0 otherwise; DTpre = 1 if the observation is prior to the transaction and the auditor at that time is Deloitte and Touche, 0 otherwise; PostD = 1 for a post-transaction observation, 0 otherwise; Dmerge = 1 if the observation is after the transaction and the original auditor was Deloitte and Touche, 0 otherwise.

observed in the prior literature to form a tight oligopoly market structure. Increased levels of concentration seem to have reduced price competition and our client-size-partitioned results suggest that this is due to product differentiation rather than anti-competitive pricing. The reduction in the number of top-tier audit firms has undoubtedly reduced auditee choice and increased the potential for conflicts of interest. The international firms have shown little signs of a willingness to de-merge their audit activities and many multinational companies do not see the mid-tier firms as a viable auditor because of their limited resources. We believe that regulators should carefully consider what they would do in the event that one of the

Big Firms failed and a large corporation was forced to retain an audit firm because of the lack of available alternatives.

We also examine whether audit fee premiums or discounts are offered by international audit firms over their rivals and whether the pre-merger fee premiums of the stronger brand name auditor spread to the other auditor after a combination. Our results indicate that there are differences both within individual firms and across different firms in the pre- and post-merger levels of real and nominal audit fees. Looking first at nominal audit fees, we find that the Coopers and Lybrand Deloitte merger increased the audit fee premium of Coopers and Lybrand over the clients formerly

Table 8

OLS Audit fee regression models of log real audit fees against audit-time identity dummies for all clients over the period 1985–2002

		coefficient	t-statistics
Intercept	?	-1.286	(17.37)
EWpre	?	-0.019	(0.23)
AYpre	?	-0.038	(0.44)
EYpost	?	0.125	(2.06)
CLpre	?	-0.099	(1.14)
DHSpre	?	0.039	(0.45)
CLpost	?	0.143	(2.74)
PWpre	?	0.057	(1.87)
Cpre	?	0.064	(1.70)
PWCpost	?	0.02	(0.68)
Dpre	?	-0.057	(1.66)
Apr	?	-0.108	(2.27)
Dpost	?	-0.007	(0.22)
NBF	—	-0.165	(7.31)
N		7255	
F		816 ^a	
R ²		0.805	

Model 3:

$$LRAFi = \alpha_{3,0} + \beta_{3,1}EWpre_i + \beta_{3,2}AYpre_i + \beta_{3,3}EYpost_i + \beta_{3,4}CLpre_i + \beta_{3,5}DHSpre_i + \beta_{3,6}CLpost_i + \beta_{3,7}PWpre_i + \beta_{3,8}Cpre_i + \beta_{3,9}PWCpost_i + \beta_{3,10}Dpre_i + \beta_{3,11}Apr_i + \beta_{3,12}Dpost_i + \beta_{3,13}NBF_i + \beta_{3,14}Controls_i + \epsilon_{3,i}$$

^a significant at the 1% level. The coefficients shown in bold are significant at the 5% level. The first figure in each panel shows the parameter estimate and the second figure the t-statistic (two-tailed) for each variable. The dependent variable is the natural logarithm of the inflation adjusted (real) audit fee.

EWpre takes the value of 1 if the observation is prior to the merger and Ernst and Whinney are the auditors and Ernst and Young audit the client after the merger. AYpre takes the value of 1 if the observation is prior to the merger and Arthur Young are the auditors and Ernst and Young audit the client after the merger. EYpost takes the value of 1 if the auditor prior to the merger is Ernst and Whinney and Ernst and Young audit the client after the merger. CLpre takes the value of 1 if the observation is prior to the merger and Coopers and Lybrand are the auditors and Coopers and Lybrand Deloitte audit the client after the merger. DHSpre takes the value of 1 if the observation is prior to the merger and Deloitte, Haskins and Sells are the auditors and Coopers and Lybrand Deloitte audit the client after the merger. CLpost takes the value of 1 if the auditor prior to the merger is Coopers and Lybrand and Coopers and Lybrand Deloitte audit the client after the merger. PWpre takes the value of 1 if the observation is prior to the merger and Price Waterhouse are the auditors and PricewaterhouseCoopers audit the client after the merger. Cpre takes the value of 1 if the observation is prior to the merger and Coopers and Lybrand are the auditors and PricewaterhouseCoopers audit the client after the merger. PWCpost takes the value of 1 if the auditor prior to the merger is Price Waterhouse and PricewaterhouseCoopers audit the client after the merger. Dpre takes the value of 1 if the observation is prior to the transaction and Deloitte and Touche are the auditors and Deloitte audit the client after the transaction. Apr takes the value of 1 if the observation is prior to the transaction and Andersen are the auditors and Deloitte audit the client after the transaction. Dpost takes the value of 1 if the auditor prior to the transaction is Deloitte and Touche and Deloitte now audits the client. NBF takes the value of 1 if a non brand-name firm audits the client.

audited by Deloitte. The Ernst and Young merger significantly increased the audit fees of former Arthur Young clients relative to those of Ernst and Whinney. The PricewaterhouseCoopers merger eliminated the discount offered by Price Waterhouse relative to Coopers and Lybrand clients. Finally, the Andersen transaction seems to have had no material effect to date. These results are consistent with

the proposition that the brand name reputation of the smaller firms improved following the mergers with their larger counterparts. Finally, looking at real audit fees, we find that the Coopers and Lybrand Deloitte, Ernst and Young mergers and the Andersen transaction increased the audit fee premiums of Coopers and Lybrand and Ernst and Young and reduced the reputation problem associated with

Andersen relative to clients audited by the benchmark firm that was not involved in merger activity (KPMG).

The study is subject to a number of limitations. In particular, caution should be exercised in assuming that these results can be generalised to apply to other countries and time periods because of differences in the structure of the markets and changes in the economic climate. Additionally, the paper might underestimate the extent of price-cutting because the auditor change variables are not able to distinguish more subtle market pressures. For example, auditor switch dummies will not identify cases where the incumbent auditor is reappointed in the tender process and any reductions will show as a fee cut by the incumbent auditor. Auditor switch dummies also cannot distinguish between efficiency gains, discounts from a normal fee and clients responding to excessively high fees by choosing to switch. Similarly, any fee reductions by the incumbent auditor resulting from pressure from the client, such as a threat to offer for tender, will not be identified. Furthermore, one is unable to generalise the results to all accounting firm mergers. We chose to focus on the pricing effects of mergers between the international accounting firms because they are likely to have a greater impact on concentration ratios and audit fees than mergers between small- and medium-sized firms due to their greater size and effect on market share. One downside with this is that the identity of the firm with the superior reputation is not obvious because the audit firms concerned are similar in size and level of expertise. Finally, due to the lack of available data, we are unable to investigate the effect of mergers on auditors' charge-out rates and costs. It is therefore impossible to ascertain whether the premium fees are distributed to partners, recognised in remunerating the employees of the firm or used to cover additional unforeseen costs.

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Book Reviews

Profitability, Accounting Theory and Methodology: The Selected Essays of Geoffrey Whittington. *Geoffrey Whittington*. Routledge, 2007. xi + 464pp. ISBN 0 415 37644 0. £85.

Few accounting academics have been honoured with a collection of their published works, and with this volume Geoff Whittington joins a distinguished company. The collection reproduces 22 papers and lectures (out of a list of some 130 publications) covering the full range of Whittington's contribution to the accounting and economics literatures. Whittington himself spent the formative years of his academic career as an economist at Cambridge working on the analysis of the accounts of UK listed companies, and the collection includes four papers based on this work. The basic question is, 'what do the figures in company accounts tell us about the relationship between variables such as profitability (and its components such as profit margin and asset turnover) and corporate growth?' Although the precise results are of only historical interest now, the papers raise issues of how useful published accounting numbers are for macroeconomic analysis. Whittington hints at a concern that the dominant historical cost model of financial reporting (made more complex by the haphazard approach of British companies to asset revaluation) was leading to corporate accounting numbers of diminishing value, particularly as the rate of inflation began to increase in the 1960s. Nonetheless, his research at this time is evidence of a belief that the financial statements of listed companies could be of value to users beyond the stock market.

To appreciate what accounting numbers are trying to tell us about what is going on inside a company, we need to understand how good particular numbers are as representations of key phenomena. Several papers in the collection explore the relevance of accounting rate of return as a measure of business performance, particularly its relationship to measures considered by economists to be more conceptually sound, such as internal rate of return. The 'academic disdain' that allegedly exists between economists and accountants did not apply here, with an active debate involving both groups in an examination of how the reporting of accounting profitability could best be aligned with economists' measures of firm performance. Given the widespread use of accounting ratios in compar-

isons and rankings of organisations, as well as in much empirical accounting research, knowledge of how ratios behave in a statistical sense is important. For example, when a researcher divides a variable by some measure of size, is this because the ratio itself is considered meaningful as an independent variable, or is it merely to deflate the variable to improve the analysis in a statistical sense (by reducing the effect of technical factors such as outliers and heteroskedasticity)? Moreover, which 'size' measure should be used? Working with Mark Tippet, Whittington explored how the two components of a ratio might relate to, and respond to, changes in each other (technically, the 'co-integration' of the variables). Users of a time series of asset turnover ratios, for example, would need to be conscious that the sales figure in later periods could be affected by investments in assets in earlier periods, made with the intention of affecting the future level of sales.

When Whittington became an accounting professor, the problem of showing the effects of inflation in corporate financial statements was emerging as a central issue for accounting theorists and practitioners. The three pieces selected to represent Whittington's contribution date from the 1980s and 1990s, and include his 1981 lecture 'Inflation accounting: all the answers'. A weakness of inflation accounting in the 1970s was its tendency to become over-technical, as complex calculations of poorly explained adjustments crowded out simple understandings of principles. It is a shame that Whittington's lecture did not appear 10 years earlier, when it could have provided a firm grounding for those who were to become enmeshed in the complexity of inflation accounting. In the UK, inflation accounting developed largely in ignorance of the continental European literature, where many of the issues had been debated and calculative techniques experimented with decades earlier. Whittington bemoans this lack of awareness of what was happening in other countries, and stresses the importance, particularly for international accounting standard setters, of knowing not just what happens in other countries but also the reasons for diversity, and of being prepared to accommodate diversity where this is necessary.

From the 1970s through to the 1990s, Whittington had to consider the appropriateness of accounting numbers for different purposes first as a member of the Meade Committee on Direct

Taxation and then as a member of the Monopolies and Mergers Commission. Two papers represent these activities. The issue of how to calculate rates of return re-emerges in the context of regulating the prices of monopoly utilities, where an important problem was the determination of the content and value of the asset base to which the rate of return would be applied. Whittington stresses the need to recognise that accounting numbers are just part of the information set available to regulators, and warns against the adoption of inflexible bases of calculation that do not reflect the changing nature of businesses.

For over 15 years, Whittington has been an accounting standard setter, as accounting adviser to and then member of the Accounting Standards Board (ASB), and subsequently member of the International Accounting Standards Board (IASB). The collection contains three papers (one written with David Tweedie) published in *Accounting and Business Research* between 1989 and 1993, which discuss the shortcomings of the pre-ASB system for setting accounting standards in the UK, set the agenda of central issues that the new ASB would address in its early years as part of the struggle against 'creative' accounting, and draw links between financial reporting and corporate governance. The paper with Tweedie was particularly prescient, as it was written before Tweedie's appointment as the first chairman of the ASB. Accounting problems that had seemed to paralyse the old Accounting Standards Committee were set out clearly and possible solutions sketched out – solutions that were to form the basis of the early Financial Reporting Standards. This section of the collection also includes a paper (written with the Swedish accounting academic Per Thorell) that examines the prospects for harmonisation of financial reporting within the European Union, anticipating some of the problems that have subsequently arisen in the relationship between the EU and the IASB.

In this collection, the best is definitely left to last, as the final section contains Whittington's overview of financial accounting theory from 1985, his critique of positive accounting theory from 1987 and his 1995 lecture 'Is accounting becoming too interesting?' reflecting on the changing roles of, and research into, accounting. The paper on financial accounting theory provides a clear summary of the development of different ways of theorising financial accounting and reporting that emerged during the 20th century, with a bias towards the more economics-influenced modes of theorising. Whittington's strong belief that accounting practice needs to be grounded in an understanding of theory and principles rather than in an ad hoc set of rules comes clearly through this paper, which was written not just for academics

and students of accounting but also for practitioners. His fair but trenchant comments on positive accounting theory give due recognition to the value of an economics-based approach to the explanation of accounting policy choice while warning against the risk that positive research may become narrow and introverted, unprepared to question its fundamental assumptions and unwilling to go beyond restrictive methodologies.

Unifying this collection of papers is a sense that accounting matters, not just in the conventional sense of providing information to investors but also in feeding into macroeconomic policy, taxation, regulation, pricing and other decisions that can collectively be labelled 'economic'. Although Whittington appreciates how the growth in accounting research in the last three decades has enhanced the reputation of accounting academics and their visibility in universities, there is a sense that both positive and critical researchers have concentrated too much on explanation and understanding of financial reporting, when principled engagement with accounting practice is needed. Whittington's career is full of such engagement, and the papers in this collection demonstrate the breadth and depth that an economist grounded in the traditions of Cambridge rather than Chicago can contribute to our thinking about accounting. Although this book appears in a series entitled 'Historical Perspectives in Accounting', the problem of how to ensure that financial accounting statements are fit for the range of purposes for which they are used will continue to challenge theorists, regulators and practitioners alike. Whittington does not conceal the difficulties that face those working to improve financial reporting, but he holds out the twin hopes that improvement is possible, and that academic theorising and research can help to make accounting better.

Royal Holloway,
University of London

Christopher Napier

The International Accounting Standards Committee: A Political History. R. J. Kirsch. Wolters Kluwer (UK) Limited, 2006. xx and 463pp. ISBN 978 1 84140 608 4. £50.

Recent years have seen a number of studies of the International Accounting Standards Committee (IASC), the International Accounting Standards Board (IASB) and the impact of their work. However, relatively little has been written on the organisations themselves and the pressures and processes leading to the production of international accounting standards. A detailed history of the IASC from the creation of the Accountants International Study Group in 1967 through to the end of the IASC in March 2001 is therefore to be welcomed.

This work started life as an official history managed by, and financially supported by, the IASC. As might therefore be expected the author, aided by Professor Chris Nobes, not only interviewed most surviving Chairs, Secretaries and Secretaries-General but also had access to detailed agendas, minutes, working papers and correspondence of the IASC. Having noticed the full title and read in the preface that the IASB decided not to proceed with publication after opposition from 'important players' to earlier drafts the reader may be expecting to find a feast of indiscretions and tales of political intrigue and in-fighting. Unfortunately, you will very largely be disappointed. There are a few tales of disputes and disagreements, but on the whole these seem trivial and the progress of the IASC reads essentially as a tale of an organisation without any serious internal conflicts. This still reads very much like an official history, as perhaps is inevitable given the range of individuals interviewed. Indeed, the biggest disappointment to me in reading this was that no voice is given to board, consultative committee or steering committee experts, so that few alternative perspectives are offered on events that at times must have been fraught with disagreement and contention.

Reading the book one is struck by just how much was achieved in such a short period. Not only were 66 exposure drafts and 41 standards produced, 21 standards were also revised. The constitution was agreed in 1973 and rewritten three times, culminating in complete re-organisation and establishment of the IASB. Agreement on mutual commitment with the International Federation of Accountants (IFAC) was reached and endorsement of international standards by the International Organisation of Securities Commissions (IOSCO) was negotiated. It is on these latter events that the book concentrates. While many of the individual standards produced are discussed, the discussions tend to be very brief and little explanation is given of how or why the specific conclusions were reached in each case.

This is a political history in that it recognises the importance of the environment in which the IASC operated and what Kirsch describes as an action / re-action / co-operation / co-option model of the relationships with external organisations. For example, Kirsch argues that the IASC did not come about simply because it was an idea whose time was due. Rather, a significant reason was probably a recognition by Benson that with the UK having joined the European Community (EC), UK accounting would be forced to become more like continental European accounting. An international organisation containing not only the major continental European countries of France, Germany and the Netherlands, but also UK, USA, Canada and Australia, had the potential to act as an effective

countervailing force. From then on many of the decisions made reflect the art of compromise and the importance of politics. However, this is essentially a history that is devoid of theory. It is a chronological rather than thematic history and while it offers possible explanations for events it does not place these in the context of any organisational or political theory of change, unlike for example the albeit more limited study of Tamm-Hallstrom (2004). Several major and minor themes are identified. The reader will find them recurring throughout the history but, given the use of a chronological ordering, it is often difficult to keep track of the themes and subjects and the often quite detailed and complex play of multiple factors. However, a number of key themes are particularly striking.

Thus, the book emphasises the importance of a few key individuals in charting the course of the IASC. Initially, of key importance were the Chairs, who were solely responsible for determining strategy, while the Secretary was more concerned with technical matters. A key change came with the appointment of David Cairns to the post of Secretary-General and even more so with his replacement by Bryan Carsberg. The Secretary-General was perhaps the key person in the creation of the IASB. Thus, the views of Carsberg, supported by the Securities and Exchange Commission (SEC), were dominant in explaining the creation of a small full-time board based upon technical expertise rather than the alternative of a part-time board based on geographical representation, as supported by the European Union (EU) and initially by the IASC Chair, Enevoldsen. This was in contrast to much of the earlier history of the IASB, where the theme of increasing representation, both geographically and professionally were of vital importance. For example, the book traces in detail the history of widening participation in the Board and the establishment of the Coordinating Committee as a way of answering critics from, in particular, developing countries and increasing co-operation with various important bodies such as the FASB, EU and IOSCO. Indeed, throughout its history, much of the IASC strategy can be explained by its need to manage external relations and balance often conflicting pressures. For example, in the early 1980s it had to chart a narrow line between emphasising to the UN its status as an organisation of accounting professionals and the importance of leaving accounting regulation to accounting professionals, while also emphasising the importance of representing a far wider constituency to the IFAC. Indeed, it was this strategy of emphasising that accounting standards could not be set solely by professional accountants if they were to achieve international acceptance that was significant in guaranteeing its independence from the IFAC.

Call for papers for a special section of *European Accounting Review* on 'Measurement Issues in Financial Reporting'

Guest Editors: Katherine Schipper (Duke University – The Fuqua School of Business)
Marco Trombetta (Instituto de Empresa Business School)

This special section will include research that addresses the problems and possibilities associated with the need to resolve pressing measurement issues in financial reporting. These measurement issues are more timely than ever in light of recent changes in financial reporting, including the increasingly widespread adoption of International Financial Reporting Standards (IFRS), the increasing use of fair value measurements for financial reporting, including optional uses (as in IAS 39 and SFAS 159) and the inclusion of measurement issues as Phase C in the joint International Accounting Standards Board (IASB)-Financial Accounting Standards Board (FASB) conceptual framework project.

Research topics appropriate for this special issue would include, but not be limited to, the following examples:

1. *Characteristics a given approach to arriving at a reported or disclosed number must have in order to qualify as a measurement basis in financial reporting*
 - a. From a financial reporting standard setting perspective, what is encompassed by the idea of 'measurement'? Is there a meaningful distinction between a measurement and a calculated number? For example, are balance sheet values that are arrived at by allocations of transaction amounts (such as the book values of plant, property and equipment) measurements? Are balance sheet values that are arrived at by subtracting a forward-looking estimate from a transaction amount (such as accounts receivable net of estimated uncollectible accounts or deferred tax assets net of a valuation allowance) measurements?
 - b. To what extent is the standard setting perspective on measurement compatible with the information economics approach to accounting theory? Can we talk about 'measurements' and 'fair values' in a context of imperfect and incomplete markets?
2. *Implications of choosing and applying a measurement basis*
 - a. Should there be one measurement basis for all balance sheet items? What are the advantage and disadvantages of the current mixed attribute model which applies both fair value (and similar) measurements and measurements based on historical transaction amounts?
 - b. Should changes in measurements be asymmetric (as, for example, in the requirement to measure certain impaired assets at fair value if that value is less than book value) or should they be symmetric (as, for example, in the accounting for trading securities)?
 - c. If comprehensive income equals changes in net assets except for transactions with owners, how should changes in measurements of assets and liabilities be displayed in a statement of comprehensive income?
 - d. How should management intent (as in the current accounting for marketable securities under IAS 39 and SFAS 115) affect the choice of measurement basis? To what extent should the choice of measurement attribute be left in management's hands (as, for example in the fair value options in IAS 39 and SFAS 159), given that this implies a lack of comparability?
3. *Qualitative characteristics of measurement bases*
 - a. Which measurement bases are most relevant? Which are most reliable? Which have the best combination of these two qualitative characteristics?
 - b. With regard to potential reliability issues, what are the most important causes of unreliable measurements?
 - c. To what extent can disclosures (in notes to financial statements) be used to address concerns about reliability of reported numbers?

4. *Reflecting uncertainty about payoffs in measurement, not recognition*

Many financial statement items embody some amount of uncertainty. Should this uncertainty be addressed through recognition criteria (as, for example, in the current version of IAS 37 and in SFAS 5) or should it be addressed through measurement (as proposed by the IASB in its exposure draft to amend IAS 37)?

5. *Implementation and expertise issues*

The adoption of IFRS by many jurisdictions in recent years has required preparers and auditors to change accounting measurements, in some cases, toward a variant of fair value or current value. Some of these measurements can require the exercise of professional judgment as well as significant estimation effort.

- a. What are the implementation issues, for preparers and auditors of financial statements, associated with this change?
- b. What are the implications of this change for the demands placed on preparer and auditor expertise, for example, the implications for accounting education?
- c. What, if any, are the implications for financial statement users?

6. *Corporate governance*

What is, and what should be, the relationship between the financial reporting measurement basis and the corporate governance structure?

- a. Arguably, measurement bases differ in terms of relevance and reliability (which includes verifiability). Given these differences, does the choice of a measurement system affect the liability of managers that sign a firm's financial reports?
- b. Should a law such as the Sarbanes-Oxley Act affect the standard setter's choice of measurement basis in authoritative guidance? Should legal considerations affect management's choice of measurement attribute, where such choices exist in IFRS and US GAAP (for example, IAS 16 permits but does not require certain non-financial assets to be measured periodically at fair value; IAS 39 and SFAS 159 permit certain financial items to be measured at every reporting date at fair value)?

Following the EAR policy of openness and flexibility regarding methodologies and styles of conducting research, papers using analytical approaches (including both mathematical modeling and qualitative reasoning), experimentation, field study methods, surveys and empirical-archival methods will be considered.

Submitted papers considered for this special section will be subject to a double blind review process. Authors are encouraged to contact the guest editors in advance should there be any matters on which they require clarification or guidance (schipper@duke.edu; marco.trombetta.ear@ie.edu). Authors should strictly follow EAR submission guidelines which can be found at: <http://www.tandf.co.uk/journals/authors/rearauth.asp>. Submissions in electronic format (MS Word) should be sent to the EAR editorial office in Madrid (Spain), via e-mail: ear@ie.edu. The subject of the message containing the electronic submission should include a reference to 'Special Section on Measurement Issues in Financial Reporting'. Additionally, one hard-copy of the paper should be sent to Professor Salvador Carmona, Editor, EAR, Calle Pinar, 15-1B, 28006 Madrid (Spain). The deadline for submissions is 19 September 2008.



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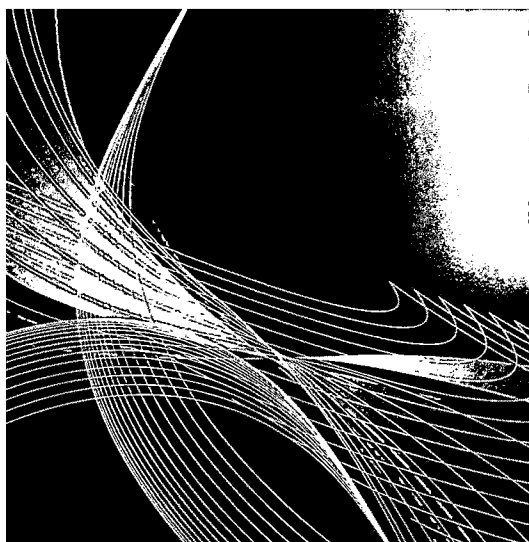
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Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelt with an 's', not a 'z'. Single quotation marks should be used, not double.

Accounting and Business Research



SPECIAL ISSUE: INTERNATIONAL ACCOUNTING POLICY FORUM

**Standard-setting measurement issues and the relevance
of research** *Mary E. Barth*

**Is fair value accounting information relevant and reliable?
Evidence from capital market research** *Wayne R. Landsman*

Financial reporting quality: is fair value a plus or a minus?
Stephen H. Penman

The SEC rules historical cost accounting: 1934 to the 1970s
Stephen A. Zeff

**How does changing measurement change management
behaviour?** *Anne Beatty*

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Accounting and Business Research

Special Issue:

International Accounting Policy Forum

2007

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Marleen Willekens and Dan A. Simunic, Precision in auditing standards: effects on auditor and director liability and the supply and demand for audit services

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All papers are subject to peer review on a double blind basis, either by members of the Editorial Board, or by invited reviewers of international standing. Reviewers are asked to comment in particular on the contribution, motivation and rigour of the analysis presented in the paper. The editor carries out an initial check that papers submitted comply with the guide to authors and advises authors where a paper has not met the essential criteria. Continuous monitoring of the review process aims at providing timely but informative feedback to authors. Subject to the recommendation of reviewers, research notes and commentaries may be published.

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Editorial

In collaboration with the Institute of Chartered Accountants in England and Wales, *ABR* is delighted to present the second issue of the *International Accounting Policy Forum (IAPF)*. The issue contains the papers presented at the Institute's 2006 Information for Better Markets conference under the theme of *Measurement in Financial Reporting*. The five papers written by leading international academics reflect the themes they were invited to develop in their presentations at the Forum. The responses from practitioners provide a taste of the lively debate provoked in a mixed audience of leading practitioners and policymakers sitting alongside academics from a spectrum of international institutions. It is the hope of the editor and the Institute that publication of the papers will encourage a continuing and widening debate to facilitate better communication among the research community, the accounting profession, company managers, regulators and all other parties interested in promoting the development of relevant measurement bases for accounting practice.

The five main papers have been reviewed by academic reviewers and I am particularly grateful to the reviewers and the authors for the care they have taken with this process.

IAPF is explicitly charged with bridging the gap between academia and the profession. The contents of this issue provide many opportunities for engaging research and practice.

Pauline Weetman

Introduction

This issue of *International Accounting Policy Forum (IAPF)* is especially relevant to current policy debates in financial reporting.

The question of measurement has become increasingly controversial in recent years and standard setters have taken steps to open up debate on it. First, in 2005, the International Accounting Standards Board (IASB) published, though it did not endorse, *Measurement Bases for Financial Accounting – Measurement on Initial Recognition*, which advocated that all assets and liabilities should be measured initially at fair value, where this can be measured reliably. Then, in 2006, the IASB and the US Financial Accounting Standards Board (FASB) published the first in a series of discussion papers as part of their project to establish a common conceptual framework.

Although this first discussion paper was on ‘the objective of financial reporting’ and ‘qualitative characteristics of decision-useful financial reporting information’, it almost certainly has implications for measurement. Also in 2006, the FASB issued SFAS 157, *Fair Value Measurements*, which clarified how the FASB believes fair value should be defined and measured. An IASB discussion paper with the same title promptly followed this.

Most recently, in January and February 2007, the IASB and FASB hosted round tables in Hong Kong, London and Norwalk to discuss bases of measurement. These meetings were held as a first step in developing the boards’ thinking on measurement ahead of its work on a discussion paper on measurement to be published as part of the conceptual framework project.

The Institute of Chartered Accountants in England & Wales (ICAEW) has taken a leadership position on this subject. In October 2006, as part of our Information for Better Markets campaign, we published *Measurement in financial reporting*. Our approach in this report is essentially a practical one. The critical test for financial reporting should be: what works? What information helps businesses, investors and other users of financial reporting to achieve their goals more effectively?

The report does not recommend any single ‘best’ basis of measurement. On the contrary, it argues that financial reporting measurement is a matter of evolving conventions, not something to which there are immutably right and wrong answers. It

also argues that the purposes of financial reporting depend on its institutional context and that this context affects the costs and benefits of different measurement bases.

The report suggests that, in making decisions on measurement requirements, it may be appropriate:

- to adopt a mixed approach to measurement for different items in accounts; and
- to distinguish between different types of entity in accordance with their industry, ownership and governance structure, and size.

The report also proposes that decisions on the regulation of financial reporting measurement should be regarded as matters of public policy, subject to the overriding tests of cost-effectiveness and fitness for purpose and the same principles of good regulatory practice as other forms of regulation.

A practical, utilitarian approach must be based on evidence of what works rather than on a priori theory, and in our report we stress the need for evidence and recommend that standard setters’ approach to measurement questions should be significantly more evidence-based than has typically been the case hitherto. In support of this objective we commissioned the five papers published here, presented at the ICAEW’s Information for Better Markets Conference in December 2006. Mary Barth’s paper gives us a standard setter’s perspective on measurement issues. Wayne Landsman’s looks at how fair value information affects markets, and Anne Beatty’s at how changing measurement affects management behaviour. Stephen Penman’s paper sets out how alternative approaches to measurement are rooted in the needs of users and how they actually use financial reporting information for valuation purposes. Stephen Zeff provides an historical context from the US in tracing the SEC’s disapproval of most upward valuations from its founding in 1934 until 1972.

It gives some indication of the value of these five papers as contributions to the debate that the IASB and FASB put links to them, as well as to *Measurement in financial reporting*, on their websites as background material for their round tables on measurement. Indeed, the round tables provided strong evidence – at least as far as those affected by accounting standards are concerned – that in

important respects the debate has already moved on. Speakers at the round tables showed little appetite for the universal imposition of a single basis of measurement, and near-unanimous acceptance of mixed bases of measurement, with different items in the accounts measured in different ways. The practical question that needs answering concerns which bases produce the most useful information for different items. The answer may well vary with the needs of different businesses and different users of financial reports, and may also change over time. I believe that our report and the papers published here have contributed to this significant change in the focus of the measurement debate.

The papers in this issue of *IAPF* will certainly be useful to the ICAEW in the continuing development of our thought leadership work on measure-

ment, and I trust that readers generally will find them helpful in developing their own thinking. I also hope that they will stimulate further research on the issues they address.

I am grateful to all the distinguished academic and practitioner contributors to this volume and, once again, to Pauline Weetman for her support and hard work as editor. Finally, I thank the ICAEW's charitable trusts, which generously provided funding to support the conference last December, preparation of the academic papers published here, and the costs of the publication itself.

Robert Hodgkinson
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Standard-setting measurement issues and the relevance of research

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1. Introduction

Measurement is a key aspect of financial reporting. This paper explains my views, as a standard setter and a researcher, on how the International Accounting Standards Board (IASB) approaches standard-setting measurement issues, the measurement bases it and other standard setters commonly consider, and how research can contribute to resolving standard-setting issues related to measurement.

The IASB approaches measurement issues in the same way as it approaches other standard-setting questions. That is, the IASB attempts to apply its conceptual framework, which is specified in its *Framework for the Preparation and Presentation of Financial Statements* (Framework, IASC, 1989). Other standard setters also base standard-setting decisions on their conceptual frameworks. For example, the conceptual framework of the US standard setter, the Financial Accounting Standards Board (FASB), is specified in its *Statements of Financial Accounting Concepts* (SFAC) Nos. 1, 2, and 5-7 (FASB, 1978, 1980, 1984, 1985, and 2000).¹ Despite its importance, measurement has received relatively little attention in the conceptual frameworks of financial reporting standard setters. Thus, in making measurement decisions, standard setters usually focus on applying the definitions of financial statement elements and the qualitative characteristics of accounting information in the context of the objective of financial reporting. The definitions identify what is to be included in the measurement, the qualitative characteristics identify the desired characteristics of the measurement, and the objective of financial reporting identifies the context in

which the measurement should be evaluated.

Application of those concepts has resulted in a variety of measurement bases being used to measure financial statement amounts. These include historical cost, amortised historical cost, fair value, and value in use, among others.² Each basis has advantages and disadvantages relative to the others in meeting the conceptual framework criteria. However, a review of the recent activities of the IASB reveals that the use of fair value in financial reporting is likely to increase. This is because as the board has debated particular measurement questions, it has concluded that in some cases fair value meets the conceptual framework criteria better than other measurement bases considered. It is not because the board has a stated objective of changing accounting measurement to fair value for all assets and liabilities. Fair value is not a panacea and other measurement bases also have desirable characteristics. Thus, which basis the IASB will require in any particular situation is not a foregone conclusion.

Research can be helpful to standard-setting debates about measurement. This is because research is generally rigorously crafted and grounded in economic theory. Also, because academics do not have a stake in the outcome of the research, research typically is unbiased. Relating specifically to measurement, research can provide insights into how alternative measurement bases, in a variety of

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¹ The conceptual framework of the UK Accounting Standards Board (ASB) is specified in its *Statement of Principles for Financial Reporting* (ASB, 1999). The conceptual frameworks of the IASB, FASB, and ASB are similar, but not identical. The IASB and FASB currently have a joint project to complete, converge, and improve their conceptual frameworks. Because the IASB and FASB anticipate the framework project will take several years to complete, they are conducting it in phases. Measurement is one of the phases.

² The UK framework (ASB, 1999) lists deprival value as a measurement basis. Deprival value is the loss that the entity would suffer if it were deprived of the asset. It is measured as the lower of replacement cost and recoverable amount, where recoverable amount is the higher of value in use and net realisable value. In its recent measurement discussion paper, the staff of the Canadian Accounting Standards Board (CASB) explains its view that deprival value is a decision rule for determining which of these measurement bases to use (IASB, 2005).

contexts, meet the criteria in the conceptual framework, such as relevance and faithful representation. Researchers also can question the current framework by rethinking the objective and characteristics of financial reporting and, if necessary, offering an alternative framework that comprehensively meets the objective and evidences the desired characteristics. Research also can identify measurement alternatives to fair value that can be used on a comprehensive basis. Relating to fair value measurement itself, research can help link valuation theories to the real world in which we live. Such research would aid standard setters, for example, in determining which assumptions underlying the valuation theory are most important and those that can be ignored. For example, most valuation theory relies on perfect and complete markets – or at least markets with no arbitrage opportunities. Without these market features, a single value for every asset and liability does not exist. But, by how much does the observed inconsistency with each of these assumptions affect the resulting value estimates? Is it enough to be concerned about from a practical perspective? There is much to learn about accounting measurement and research can aid standard setters in identifying the issues they need to address, helping them structure their thinking about the issues, and providing evidence that informs the debate about the issues.

The paper proceeds as follows. Section 2 explains how the IASB approaches measurement issues, and attempts to dispel some common misunderstandings. Section 3 discusses why the IASB has increasingly focused on fair value and identifies some of the possible alternatives. Section 4 suggests some ways in which research can inform standard-setting measurement issues. Section 5 offers concluding remarks.

2. How do standard setters approach measurement?

2.1. Conceptual framework

As with any standard-setting decision, when making decisions relating to accounting measurement, the IASB strives to follow its *Framework*. Unfortunately, the current *Framework* does not include much guidance on measurement. It simply lists examples of measurement bases, such as historical cost and settlement value, and measurement techniques, such as present value, that are currently used in financial statements.³ It does not identify their key attributes or provide criteria for selecting among them, and it does not list all possible measurement bases that the board should consider. Thus, when applying the *Framework* to measurement questions, the IASB focuses on determining which measurement basis best meets the objective of financial reporting, the elements definitions, and the qualitative characteristics of accounting information. The objective of financial reporting sets the context for evaluating the measurement, the definitions identify what should be measured, and the qualitative characteristics identify the desired characteristics of the measurement. The treatment of measurement in the FASB's conceptual framework, specifically SFAC 5, is similar to that in the IASB's *Framework*. Thus, the present joint IASB/FASB conceptual framework project includes a separate phase on measurement aimed at developing concepts relating to measurement in financial reporting.⁴

At the present time, the first two chapters of the converged IASB/FASB framework, comprising the first phase, have been exposed as a preliminary views document for public comment. These chapters cover the objective of financial reporting and the qualitative characteristics of accounting information. Because the boards believe that these two exposed chapters represent clarification of the current frameworks, not conceptual changes, this paper uses the proposed revised and clarified wording when discussing objective of financial reporting and the qualitative characteristics of accounting information. Much of the discussion in this section is taken directly from the preliminary views document (IASB, 2006a).

The objective of financial reporting is 'to provide information that is useful to present and potential investors and creditors and others in making investment, credit, and similar resource allocation decisions.' (IASB, 2006a, para. OB2). The term 'investors' refers to present and potential equity holders and their advisers, and the term 'creditors' refers to present and potential lenders and their advisers. The resource allocation decisions of these users include determining whether to buy, sell, or hold equity securities and whether to lend funds to or call existing debt issued by the entity. Despite

³ Some use the term 'present value' to refer to an estimate of current value. Others, including the IASB, use the term to refer to the technique of calculating a discounted stream of expected cash flows and, thus, consider it a measurement technique, not a measurement basis. Several measurement bases use present value calculations to determine the measure – the bases differ depending on which expected cash flows are included and which discount rate is used. For example, fair value uses cash flows a market participant would expect and value in use uses cash flows the entity would expect, even if they differ from those a market participant would expect. Yet, both can be estimated using present value techniques. Thus, for present value to be a measurement basis, the characteristics of the current value it is intended to measure must be specified, by specifying the characteristics of the expected cash flows and the discount rate to be used in the calculation.

⁴ At the request of the IASB, the staff of the CASB analysed the characteristics of alternative measurement bases and issued a discussion paper to invite comments on its analysis. The CASB staff concluded that fair value should be the measurement basis for initial recognition for all assets and liabilities (IASB, 2005). Comments received on the discussion paper will inform the measurement phase of the joint IASB/FASB conceptual framework project.

the fact that equity investors, particularly, and creditors are interested in estimating the values of the entity and its equity, it is not the objective of financial reporting to provide such estimates. Rather, the objective of financial reporting is to meet the information needs of a wide range of users in making a wide range of economic decisions, which are not limited to those dependent on estimates of entity or equity value.

The objective of financial reporting focuses on these users based on the belief that meeting their needs will meet the needs of other financial statement users. For example, as the preliminary views document points out, consistent with the current IASB *Framework*, 'users of financial reports wishing to assess how well management has discharged its stewardship responsibilities are generally interested in making resource allocation decisions... Decisions about whether to replace or reappoint management, how to remunerate management, and how to vote on shareholder proposals about management's policies and other matters are also potential considerations in making resource allocation decisions...' (IASB, 2006a, para. OB28).⁵ The objective of financial reporting affects measurement decisions because it establishes the context for assessing the qualitative characteristics of accounting information, including accounting measurements.

The qualitative characteristics of accounting information in the preliminary views document (IASB, 2006a, ch. 2) are relevance, faithful representation, comparability, and understandability. Relevant information is capable of making a difference to a financial statement user's decisions. Relevant information has predictive value, i.e., it helps users to evaluate the potential effects of past, present, or future transactions or other events on future cash flows, and confirmatory value, i.e., it helps to confirm or correct their previous evaluations. Making the information available to users before it loses its capacity to influence their decisions, i.e., timeliness, is another aspect of relevance. Faithful representation means that the information reflects the real-world economic phenomena that it purports to represent. Real-world economic phenomenon are economic resources and obligations and the transactions or other events that change them. Accounting constructs that are the creation of accountants, such as deferred charges, are not real-world economic phenomena (IASB, 2006a, para. QC18). Neither are

results of calculations, in themselves. Components of faithful representation include verifiability, i.e., different knowledgeable and independent observers would reach general consensus, neutrality, i.e., freedom from bias intended to attain a predetermined result or to induce a particular behavior, and completeness, i.e., all of the information that is necessary for a faithful representation is included.

As the preliminary views document explains, the qualitative characteristics are subject to two pervasive constraints, materiality and benefits that justify the costs. Information is material if its omission or misstatement could influence the resource allocation decisions users make. It is a pervasive constraint on the information to be included in an entity's financial report rather than a qualitative characteristic of accounting information. The benefits and costs contemplated in the *Framework* are broad. The benefits of financial reporting information include better investment, credit, and similar resource allocation decisions, which in turn result in more efficient functioning of the capital markets and lower costs of capital for the economy as a whole. Costs include direct and indirect costs incurred by both preparers and users of financial statement information, as well as by auditors and regulators. Assessing whether the benefits exceed the costs is inherently subjective because it is not possible to obtain quantitative data on all costs and benefits. However, the requirement to assess benefits and costs means that in setting standards, the IASB needs to consider practicality as well as concepts.

Comparability, which includes consistency, is the quality of information that enables users to identify similarities in and differences between two sets of economic phenomena. That is, it is undesirable if similar transactions, events, or conditions look different or if different transactions, events, or conditions look alike. Consistency helps achieve comparability because it refers to the use of the same accounting policies, either from period to period within an entity or in a single period across entities. Understandability is the quality of information that enables users who have a reasonable knowledge of business and economic activities and financial reporting, and who study the information with reasonable diligence, to comprehend its meaning.

When making measurement decisions, the IASB also takes into consideration the *Framework* definitions of assets and liabilities:

- An *asset* is a resource controlled by the entity as a result of past transactions and events and from which future economic benefits are expected to flow to the entity.
- A *liability* is a present obligation of the entity arising from past events, the settlement of which

⁵ Some view stewardship as necessitating an historical cost measurement basis. Others disagree and view stewardship as unrelated to the selection of measurement basis. Rather, they view stewardship as relating to ensuring the entity's management has not inappropriately enriched itself at the expense of investors and creditors (see, e.g., IASB, 2006a, Alternative View to ch.1).

is expected to result in an outflow from the entity of resources embodying economic benefits.

These definitions specify the real-world economic phenomena that accounting should measure, even though they do not specify how to measure them. In particular, the definitions make clear that not all expected inflows and outflows of economic benefits are assets and liabilities for financial reporting purposes.

2.2. Common misunderstandings

There are several common misunderstandings about how the IASB approaches measurement decisions.⁶ First, the *Framework* does not identify conservatism as a qualitative characteristic of decision-useful financial information. Conservative amounts are not neutral, which is a qualitative characteristic. As noted in Section 2.1, neutrality means freedom from bias. Conservatism implies a negative bias for assets and income and a positive bias for liabilities and expenses.⁷ Some argue that because, historically, accounting amounts have been conservative, accounting amounts are useful for purposes beyond those anticipated by the objective of financial reporting, e.g., debt contracting (Watts, 2003). However, the fact that accounting amounts have been used for this purpose does not imply that such use should affect standard-setting decisions in the context of the stated objective of financial reporting.⁸

Second, matching is not a separate concept in the *Framework*. This is because matching is not an objective of accounting recognition or measurement, per se. Rather, it is an outcome of applying the other concepts. That is, the *Framework* is based on the notion that if assets and liabilities are appropriately recognised and measured, profit or loss will be too, which obviates the need for a separate concept of matching. Although the existing *Framework* (IASB, 1989 para. 95) discusses the concept of matching income and expenses, the discussion ends by stating 'However, the application of the

matching concept under this *Framework* does not allow the recognition of items in the balance sheet which do not meet the definition of assets or liabilities.' Thus, matching per se cannot be used to justify income or expense recognition that is inconsistent with the definitions of assets and liabilities.

Third, the term reliability as used in the current *Framework* is neither limited to verifiability, as some interpret it, nor does it mean precision. It means faithful representation of the real-world economic phenomenon it purports to represent. This common misunderstanding is why the preliminary views document (IASB, 2006a) uses the term 'faithful representation' rather than 'reliability' and explains that just because an amount can be calculated precisely, it is not necessarily a faithful representation of the real-world economic phenomenon it purports to represent. Faithful representation implies neither absolute precision in the estimate nor certainty about the outcome.

Fourth, the objective of financial reporting does not include providing accounting information for management to use in managing the business or for contracting parties to include in contracts. This is because these users can directly specify the information they want and need. IASB standards are designed for general purpose financial reports, whose objective stems from the information needs of external users who lack the ability to prescribe all the financial information they need from the entity. This is not to say that measures used for financial reporting are not useful for managing the business or contracting purposes. But, if they are, this is a by-product, not an objective, of external general purpose financial reports.

Fifth, the *Framework* focuses on defining financial position elements, i.e., assets and liabilities, not because financial position is more important than profit or loss. Rather, it is because profit or loss is important. Defining financial position elements is the only way standard setters have been able to determine how to measure revenues and expenses, which comprise profit or loss. To date, attempts to define revenues and expenses without reference to assets and liabilities have been unsuccessful. This approach also is consistent with the concept of economic income being the change in wealth during the period (Hicks, 1946).

Sixth, the IASB does not have an objective to measure all assets and liabilities at fair value. As explained in Section 3, there are reasons why fair value is a candidate measurement basis in many situations, and the IASB and FASB have a stated long-term objective to measure all financial assets and liabilities at fair value. However, there is no similar objective to measure other assets and liabilities at fair value.

⁶ See Storey and Storey (1998) for a history of some of these misunderstandings in the context of the development of the FASB's conceptual framework.

⁷ The current IASB *Framework* includes prudence as a dimension of reliability. However, the *Framework* states that prudence 'is the inclusion of a degree of caution in the exercise of judgment needed in making estimates required under conditions of uncertainty ... However, the exercise of prudence does not allow, for example, the creation of hidden reserves or excessive provisions, the deliberate understatement of assets or income, or the deliberate overstatement of liabilities or expenses, because the financial statements would not be neutral and, therefore, not have the quality of reliability.' (IASB, 1989, para. 37).

⁸ See IASB (2006a, para. BC 2.19 to BC2.22). Also, if conservatism were a desirable qualitative characteristic, the *Framework* would need to specify how much conservatism is desirable and how to measure it.

3. Which measurement basis?

3.1. Fair value

Observation of IASB deliberations reveals that it considers fair value as a possible measurement basis in many situations. A primary reason for this is that the *Framework* criteria make fair value a natural measurement basis to consider. First, fair values are relevant because they reflect present economic conditions relating to economic resources and obligations, i.e., the conditions under which financial statement users will make their decisions.⁹ Also, research shows that fair values have predictive value (see, e.g., Barth et al., 1995; Aboody et al., 1999).¹⁰ Second, fair values can be faithful representations of assets and liabilities, as defined in the *Framework*, because they reflect risk and probability-weighted assessments of expected future cash inflows and outflows. Fair values are unbiased and, thus, neutral. Fair values are timely because they reflect changes in economic conditions when those conditions change (see, e.g., Barth et al., 1996; Barth et al., 1998; Aboody et al., 1999). Third, fair values are comparable because the fair value of any particular asset or liability depends only on the characteristics of the asset or liability, not on the characteristics of the entity that holds the asset or liability or when it was acquired. Fair values enhance consistency because they reflect the same type of information in every period.¹¹

Despite these advantages, fair value measurement is not a panacea. Some commonly expressed concerns include lack of a clear definition of fair value, lack of verifiability, the ability for management to affect fair value estimates, and the potential circularity of reflecting fair values in financial statements when the objective is to provide financial statement users with information to make economic decisions that include assessing the value of the entity.

Regarding the definition of fair value, the IASB defines fair value as 'the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's

length transaction' (IAS 39 para. 9; IASB, 2004). Although this definition states the measurement objective, it lacks sufficient specificity to ensure consistent application. Because of similar problems in US accounting standards, the FASB issued Statement of Financial Accounting Standards (SFAS) No. 157 (FASB, 2006), which provides a more precise definition of, and specifies how to estimate, fair value. The IASB has on its agenda a fair value measurement project, and issued SFAS 157 as a discussion document as the first step in the project's due process. Until the IASB completes its fair value measurement project, the concerns about lack of specificity are valid for entities applying international accounting standards; SFAS 157 has mitigated these concerns for entities applying US standards.

Regarding verifiability of fair value, verifiability is a component of faithful representation. The concern over verifiability of fair value often is expressed in relation to assets and liabilities that do not have observable market prices. For such assets and liabilities, fair value must be estimated, which raises the possibility that the estimates will not be verifiable. As explained in section 2.1, information is verifiable if different knowledgeable and independent observers would reach general consensus, although not necessarily complete agreement. IASB (2006a) explains that verification can be direct or indirect. Indirect verification involves determining whether the measurement method has been applied without material error or bias, and relies on verifying the inputs to the measurement method. Direct verification relies on verifying the measurement itself. Thus, fair values may not be verifiable in some situations if many inputs to the measurement method are not verifiable.

Regarding management affecting fair value estimates, the effect of management incentives on fair value estimates is also of concern primarily when observable market prices are unavailable. The fact that fair value estimates incorporate and, thus, reflect managers' detailed information that is not necessarily available to others is a desirable aspect of fair value. Reflecting such information in financial statements mitigates the need for market participants to develop noisy estimates based only on public information. Nonetheless, the concern about the effects of management incentives is valid. But, it is not unique to fair value. A large body of research shows that managers find ways to manage earnings regardless of the accounting regime.¹² Whether this is a greater potential problem for fair values than for other accounting estimates is an open empirical question (see, e.g., Landsman, 2006).

Finally, regarding potential circularity, it is unlikely that even if all recognised assets and liabilities were measured at fair value, recognised equity

⁹ See Barth et al., (2001), Landsman (2005), Landsman (2006) and Barth (2007), for summaries of empirical research relating to the value relevance of fair values. Finding that fair values are value relevant indicates they are relevant and sufficiently representationally faithful to be included in investors' equity valuation assessments.

¹⁰ The preliminary views document explains that predictive value refers to inputs into a predictive process. Relevant information need not predict itself (IASB, 2006a para. QC10-QC11). For example, the research cited above shows that fair values help predict future cash flows, which are of interest to investors in valuing the entity's equity. Current fair values or changes in them do not necessarily predict future fair values or changes in them, and need not do so to have predictive value to financial statement users.

¹¹ For more discussion, see IASB (2005) and Barth (2006).

¹² See, e.g., Healy and Wahlen (1999) for a review of this literature.

would equal the market value of equity. This is because only assets and liabilities that meet the *Framework* definitions are candidates for recognition. Market value of equity reflects investors' assessments of, among other things, growth options and managerial skill that do not meet the asset definitions. Also, in most cases, the market used to estimate fair value for individual assets and liabilities is not the market for the entity's equity. However, in some cases, such as major business combinations or for single reporting unit entities, it could be.

Another reason that the IASB considers fair value in most measurement situations is that its use holds promise for minimizing the undesirable effects of the mixed measurement approach to financial reporting that we have today.¹³ Presently, financial statement amounts are determined using a variety of measurement bases. These include, for example, historical cost (used for cash), amortised historical cost (used for loans receivable and long-term debt), impaired amortised historical cost (used for purchased property, plant, and equipment), accumulated amortised and impaired historical cost (used for self-constructed property, plant, and equipment), fair value (used for derivatives and asset revaluations), and entity-specific value (used for impaired inventories and impaired property, plant, and equipment).¹⁴ These differences in measurement bases do not result from differences specified in the *Framework*. Rather, they result from conventions and differences in practice that have evolved over time. Thus, when viewed in terms of the *Framework*, these differences generate financial statements that are internally inconsistent. Not only is use of multiple measurement bases conceptually unappealing, but also it creates difficulties for financial statement users. Measuring financial statement amounts in differ-

ent ways complicates the interpretation of accounting summary amounts such as profit or loss. Using multiple measurement bases makes it difficult for financial statement users to separate accounting-induced income or expense from economic income or expense (see, e.g., Barth, 2004). Thus, fair value applied comprehensively has appeal.

3.2. *Alternatives to fair value*

Although opponents of more comprehensive use of fair value have some legitimate concerns, standard setters are unaware of a plausible alternative. Some opponents advocate historical cost. However, we do not comprehensively use historical cost in financial statements today. Items initially recognised at cost typically are subsequently measured at amortised and impaired amounts; these are not historical cost. Thus, one would need to specify how these items should be measured subsequent to initial recognition. Also, it is unclear whether historical cost has the qualitative characteristics of accounting information specified in the *Framework*. For example, although historical cost is a real-world economic phenomenon and, thus, an historical cost measure can be a faithful representation, historical cost may not be a relevant economic phenomenon for users making economic decisions. However, cost is not always clearly identifiable, for example for self-constructed assets or assets acquired in a basket purchase, which raises verifiability concerns. Also, the present convention of recognising decreases in asset values, i.e., impairments, but not increases in asset values, is inconsistent with neutrality. Moreover, some assets and liabilities have no cost – notably derivatives. This raises the question of how such assets and liabilities would be reflected in historical cost financial statements without either leaving them unrecognised or creating a mixed measurement approach.

Value in use, or entity-specific value, is another possible measurement alternative.¹⁵ Value in use requires including future cash flows that the entity expects to receive, discounted at a rate that perhaps reflects the entity's cost of capital, even if these differ from those of other entities. Thus, entity-specific value differs from fair value in that entity-specific value includes cash inflows or outflows expected by the entity that would not be expected by other market participants, such as expected inflows related to superior management talent.¹⁶ Thus, entity-specific value can result in embedding the measure of an intangible asset, e.g., superior management talent, in the measure of another asset, e.g., property, plant, and equipment. As with all measurement bases, measuring assets and liabilities at entity-specific value also has implications for profit or loss measurement. Because

¹³ Until and unless fair value is used for all assets and liabilities, the mixed measurement approach will persist. Even then, issues related to cash flow hedges remain. However, the more consistently we measure assets and liabilities, the less the mixed measurement approach is a problem.

¹⁴ The staff on the measurement phase of the joint IASB/FASB conceptual framework project is attempting to identify the different measurement methods currently used in IASB and FASB standards. Thus far, the staff has identified at least 12. For many of the methods, there is no obvious reason for the differences from other methods. This observation makes clear the need to rationalise the methods we use.

¹⁵ The IASB defines entity-specific value as 'the present value of the cash flows an entity expects to arise from the continuing use of an asset and from its disposal at the end of its useful life or expects to incur when settling a liability' and defines value in use as 'the present value of estimated future cash flows expected to arise from the continuing use of an asset and from its disposal at the end of its life' (IASB *Glossary of Terms*, IASB 2006b). The distinction between these definitions is not obvious and, thus, the terms typically are used interchangeably.

¹⁶ See SFAS 157 (FASB, 2006) for further discussion.

entity-specific value measures, assets and liabilities are based on what the entity expects to accomplish with the assets, the value of the entity's special rights or skills are recognised when the assets are recognised, not when the entity realises the benefits associated with those special rights or skills. Thus, profit or loss resulting from using entity-specific value for asset and liability measurement would reflect how the entity performed during the period given the assets at its disposal relative to its own expected performance based on its plans and special rights or skills. In contrast, using fair value would result in profit or loss reflecting how the entity performed during the period given the assets at its disposal relative to other market participants' expected performance. If the entity makes better use of the assets, profit will be greater than the return expected based on the risk of its net assets; if it makes worse use of the assets, profit will be less than the expected return.¹⁷

It could be possible to decouple financial position measurement from profit or loss measurement. This would eliminate the need to consider the profit or loss effects associated with a particular asset and liability measurement basis. To date, standard setters have been unsuccessful in developing concepts about how this would be done. Thus, those advocating this approach need to provide a conceptual basis for doing so.

There could be other alternatives that standard setters should consider. They are open to ideas. However, before adopting one of those ideas, standard setters need to understand the conceptual basis for the idea, and how it could be applied comprehensively in financial reporting.

4. How can research contribute?

Measurement is key to financial reporting. Thus, it is important that standard setters base their decisions relating to measurement on the best possible information. Some believe that research cannot be relevant to standard-setting issues. It is well-known that empirical research cannot directly an-

swer standard-setting questions (see, e.g., Gonedes and Dopuch, 1974; Beaver, 1998). This primarily is because accounting standards and the results of their implementation are public goods. That is, one entity's use of the standards does not diminish the benefits that can be derived by another entity's use of the standards. Also, there are externalities. That is, there are benefits and costs associated with accounting standards and financial reporting that are not enjoyed or borne by only those entities that enjoy or bear direct benefits or costs. However, there is no market or other mechanism that aggregates all of these benefits and costs. Thus, standard setters must determine how to make any social welfare trade-offs necessary when establishing the requirements in a standard. Because empirical research typically relies on markets and other aggregation mechanisms, such research cannot be used to determine what the requirements of any particular standard should be.

Others believe that research can provide insights into standard-setting issues. It can do so, for example, by operationalising criteria standard setters establish for deciding among alternatives when developing standards, such as relevance and faithful representation. Because these criteria are specified in the conceptual frameworks of the FASB and IASB, researchers need not specify the objective functions of standard setters. Standard setters are potentially interested in research of all types because they actively seek input on all of the issues they consider; research can be particularly helpful because it is unbiased, rigorously crafted, and grounded in economic theory.¹⁸ Thus, research can aid standard setters in identifying issues, structuring their thinking about a particular issue, and providing evidence that informs the debate about the issue (see Barth, 2006 for a more complete discussion and for examples of research that does this; see also Landsman, 2006).

Relating specifically to accounting measurement, research can provide insights into whether and the extent to which various measurement bases, in various contexts, meet the qualitative characteristics of accounting information specified in the *Framework*. It also can help determine which real-world economic phenomena are relevant to financial statement users. There is a large body of financial accounting research, particularly empirical capital markets research, described as adopting a measurement perspective (Beaver, 1998) that does this; more is needed.¹⁹ Because faithful representation is a key concern for any measurement, and no representation is perfect, research providing insights into how faithful is faithful 'enough' would be helpful. Such research aids standard setters in making measurement decisions in the context of their own criteria.

Research also can explore comprehensive finan-

¹⁷ Using historical cost for all assets would reflect how the entity performed given the cost of its assets. Using a mixed measurement model, as we do presently, reflects a mixed view of entity performance, with unclear interpretation. The interpretation of profit or loss is also affected by which assets and liabilities are recognised. The amounts recognised for individual assets and liabilities do not necessarily reflect all sources of expected inflows or outflows of the entity's economic benefits. A notable example is internally generated intangible assets. Thus, profit or loss in a given period also includes cash flows associated with unrecognised assets and liabilities, as well as unrecognised but expected future transactions. See Barth (2006).

¹⁸ See Barth et al., (2001) and Holthausen and Watts (2001) for alternative perspectives on these issues.

¹⁹ See e.g., Landsman (1986), Barth (1991), Choi et al., (1997). See also Barth (2006) for further discussion and more examples.

cial reporting measurement alternatives to fair value. As noted above, many have concerns with using fair value as the measurement basis in a variety of situations but there is no clear alternative under consideration. Standard setters would like to understand why the alternative is better in terms of meeting the objective of financial reporting and the qualitative characteristics of accounting information. They also would like to understand how the alternative would apply to various types of assets and liabilities and what it implies for profit or loss measurement.

Fair value is a measurement basis even for assets and liabilities that do not have observable market prices. Thus, standard setters would find helpful research that relates valuation theory to the imperfect and incomplete world in which we live. Accountants must become more comfortable with valuation theories, techniques, and practicalities. Simply saying that valuation theory does not fit all aspects of the real world is not helpful. Research identifying how the differences between the assumptions underlying the theory and the real world can be addressed, would be helpful. Such research would highlight where problems arise, identify which failed assumptions are most important and which can safely be ignored, and provide insights into how standard setters should think about dealing with the problems.

Research also can suggest alternatives to the current *Framework*. Researchers could use economic and finance theory to aid standard setters in rethinking financial reporting and, thus, the criteria in the *Framework*. This would include suggesting changes to the objective of financial reporting, the qualitative characteristics of accounting information, and the elements definitions that comprise an alternative financial reporting regime. This could lead to considering alternative measurement bases. Researchers are perhaps the best persons to do this because it is a conceptual exercise that requires new thinking not hampered by past practices.

5. Conclusion

Many standard-setting decisions relate to accounting measurement. The IASB bases its measurement decisions on its conceptual framework. Unfortunately, the present framework contains virtually no guidance on measurement. The IASB and FASB are presently conducting a joint project to complete, converge, and improve their conceptual frameworks. One phase of that project is devoted to measurement. However, until that phase is complete, the IASB must continue to base its decisions on the definitions of assets and liabilities and its assessment of the qualitative characteristics of accounting information, in the context of the objective of financial reporting. The lack of guidance specific to measurement in the conceptual

framework means that measurement issues are likely to continue to be difficult to resolve. Because measurement is vital to financial reporting, the issues are also likely to be controversial.

Observation of IASB standard-setting deliberations reveals that use of fair value as a measurement basis is likely to increase. This is because as the board has debated particular measurement questions, it has concluded that in some cases fair value meets the conceptual framework criteria better than other measurement bases considered. It is not because the board has a stated objective of changing accounting measurement to fair value for all assets and liabilities. Fair value is not a panacea, and other measurement bases also have desirable characteristics. Also, standard setters' cost-benefit assessments can differ depending on the issue at hand. Thus, which basis the IASB will require in any particular situation is not a foregone conclusion.

Researchers can help the IASB resolve these issues at the conceptual and practical levels. Research is particularly valuable to standard setters because it is unbiased, rigorously crafted, and grounded in economic theory, as is the conceptual framework. Research can aid standard setters by identifying issues they need to address related to measurement, structuring their thinking related to those issues, and providing evidence that informs their debate about the issues. Relating specifically to fair value as a measurement basis, research can provide more evidence on the extent to which fair value meets the criteria specified in the *Framework*. It also can help relate valuation theory to accounting measurement in the incomplete and imperfect world in which we prepare financial reports.

The time has come to resolve measurement issues in financial reporting.

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of timing asset sales for income management purposes.^{16,17}

One interesting study of Danish banks, Bernard et al. (1995), focuses on the impact of fair value accounting on bank regulatory capital as opposed to the value relevance of fair values for investors. Denmark is an interesting research setting because Danish bank regulators have used mark-to-market accounting to measure regulatory capital for a long period of time. Bernard et al. (1995) find that although there is evidence of earnings management, there is no reliable evidence that 'mark-to-market' numbers are managed to avoid regulatory capital constraints.¹⁸ In addition, when compared to US banks, Danish banks' mark-to-market net equity book values are more reliable estimates of their equity market values, thereby providing indirect evidence that fair value accounting could be beneficial to US investors and depositors.¹⁹

3.3. US-based stock option research

As noted above, estimates of employee stock options fair values have been required to be disclosed for several years under SFAS No. 123. Several studies examine the value relevance of such disclosures, including Bell et al. (2002), Aboody et al. (2004), and Landsman et al. (2006). Findings in Bell et al. (2002) differ somewhat from those in Aboody et al. (2004), although both studies provide evidence that employee option expense is value relevant to investors. Landsman et al. (2006)

provide theoretical and empirical support for measuring the fair value of employee stock option grants beyond grant date, with changes in fair value recognised in income along with amortisation of grant date fair value.

Because quoted prices for employee stock options typically are not available because of non-tradability provisions, the fair value estimates are based on models that rely on inputs selected by reporting firms. Aboody et al. (2006) find evidence that firms select model inputs so as to manage the pro forma income number disclosed in the employee stock option footnote. This finding is potentially relevant to accounting standard-setters as well as bank regulators in that it is additional evidence that managers facing incentives to manage earnings are likely to do so when fair values must be estimated using entity-supplied estimates of values or model inputs if quoted prices for assets or liabilities are not readily available.²⁰ If managers have the incentive to use discretion when estimating fair values of on- and off-balance sheet asset and liability amounts when such values are not recognised in the financial statements, it is reasonable to assume the incentive will only increase if fair value accounting is used for recognition of amounts on the balance sheet and in the income statement.

4. Fair value implementation issues

Estimating fair value, i.e., exit value, for assets and liabilities is relatively easy if they are actively traded in liquid markets. The problem becomes more complicated if active markets do not exist, which is why the FASB offers Level 2 and Level 3 estimation categories in SFAS 157. Although absence of active markets is an obvious problem for non-financial assets, the problem is no less obvious for financial instruments, particularly if the financial instrument is a compound instrument comprising several embedded option-like features, values for which depend on inter-related default and price risk characteristics.

In this section, I discuss issues relating to implementation of fair value estimates when market prices for particular financial instruments are not readily available by focusing on findings from two related studies by Barth et al. (1998, 2000) on the use of binomial option pricing models to estimate fair values for corporate debt and its components. The issues I discuss should provide some insights to the FASB and IASB regarding the relevance and reliability of Level 3 fair value estimates.

4.1. Binomial option pricing of corporate debt

Barth et al. (1998) uses a binomial option pricing model to estimate the fair values of corporate debt and its components, i.e., conversion, call, put, and sinking fund features, to provide evidence on

¹⁶ In another study using the same sample of firms as that used in Muller and Riedl (2002), Dietrich et al. (2001) find that UK investment property firms in the pre-1993 period appear to select the valuation approach – historical cost or fair value – that results in smoother earnings. Because post-1993 UK firms were required to disclose income from property sales separately on the income statement, the authors interpret this as evidence that changes in disclosure requirements altered manager's use of property sales to smooth earnings. Dietrich et al. (2001) also find evidence that property appraisal estimates of fair value better reflect asset selling prices than historical costs, and interpret this as evidence consistent with greater reliability of fair value estimates, at least with respect to assets that are ultimately disposed.

¹⁷ See Lin and Peasnell (2000) for a discussion of managerial strategic considerations in the timing asset revaluations. The study provides evidence that firms appear to time asset revaluations to offset the effects of so-called equity depletion arising from immediate write-off of goodwill.

¹⁸ The ability to mark-to-market an asset suggests the existence of a reasonably liquid market for the asset. From this perspective, mark-to-market values can be viewed as approximating Level 1 or Level 2 fair value estimates.

¹⁹ Bernard et al. (1995) caution that drawing inferences from the Danish experience with fair value accounting for banks regarding the benefits of requiring fair value accounting for US banks is subject to many caveats. These include differences in the relative size of the US and Danish banking sectors, as well as relative differences in US and Danish banking regulatory systems.

²⁰ See also the discussion above of the Barth et al. (1996) findings relating to loans fair values estimates by banks with lower regulatory capital.

the relevance and reliability of estimated fair values. A companion study, Barth et al. (2000), describes details of how the binomial model is implemented. The 1998 empirical study is based on data from 1990 for a sample of 120 publicly traded US firms that have corporate debt with multiple embedded option features. The binomial model the study implements is based on the models of Cox et al. (1979) and Rendleman and Barter (1979), and considers directly only default risk, but includes information in the interest rate yield curve.

Findings from Barth et al. (1998) reveal component value estimates are relevant in that they represent large fractions of estimated total bond fair value. In addition, implementing a fundamental components approach in which call options are classified as assets, conversion options as equity, and put options as debt, indicates there are material changes to recognised balance sheet accounts and debt-to-equity ratios for sample firms.²¹ The study also finds that estimates of component fair values depend on whether a bond has multiple features. For example, the value of the conversion feature for a convertible, callable bond depends on the value of the call feature and vice versa. In addition, because components' values are interdependent, the order in which components are considered when estimating each bond's total fair value can materially affect each component's estimated fair value. This issue is particularly important if a fundamental components approach is used for separate recognition of bond components as assets, liabilities, and equity.

²¹ See FASB (1990, 2000) for a description of the fundamental components approach to accounting for complex financial instruments. In addition to the FASB, several other standard-setters have considered or require separating compound financial instruments into components, including the CICA (Section 3860 of the *CICA Handbook*, 'Financial Instruments – Disclosure and Presentation') and the AASB (AASB Accounting Standard 1033, *Presentation and Disclosure of Financial Instruments*). Under the revised version of IAS 32 (IASB, 2003a), firms that issue compound financial instruments with debt and equity components must account for, and present separately, the components according to their substance based on the definitions of liability and equity.

²² Relatedly, as noted above, Cotter and Richardson (2002) also suggest managers have superior information about non-investment property values and therefore rely on director estimates of fair value rather than appraisals for these assets. However, this does not preclude requiring managers to disclose assumptions they make as inputs to the valuation process.

²³ This is not to suggest that informational asymmetry is peculiar to fair value estimation by managers. Informational asymmetry arises in accounting whenever managers have discretion regarding the timing or amount of non-market adjustments to amounts arising from past transactions, e.g., allowances bad debt, allowances for loan losses, and impairment charges.

However, additional evidence in Barth et al. (1998) suggests model estimates of total bond value may lack reliability. In particular, when the authors re-estimate bond fair values excluding from the sample those bonds with available market prices (such bonds comprise approximately half of sample bonds), estimated bond values for those bonds that are not publicly traded differ significantly from value estimates when all bonds are included in the estimation procedure. This finding suggests that financial instruments' fair value estimates are sensitive to whether actual market price information from other instruments an entity has on its balance sheet is available for use as model inputs.

Barth et al. (1998) reach several conclusions regarding limitations to implementation of binomial option pricing models for estimating bond fair values that generalise to all financial instruments issued or held by an entity. First, the authors had to make several educated guesses for values of model inputs (e.g., conversion schedules and equity volatility). In principle, managers of the reporting entities likely have access to better information than financial statement users (including academic researchers), and the authors suggest that fair value estimates could improve if firms were required to disclose them.²² Second, models quickly become too complex and difficult to implement if they are to incorporate all of the dimensions of risk and value that can affect an instrument's fair value. For example, presently, few models consider both interest rate and default risk. In addition, financial instruments' fair values are interdependent. For example, the fair value of one debt instrument issued by an entity is dependent upon actions that holders of another debt instrument issued by that entity can take. The model Barth et al. (1998) implement considers some sources of bond value interdependence (e.g., debt priority) but basically ignores the issue because of its complexity. The issue of financial instruments' value interdependence is another illustration of the issue raised by Barth and Landsman (1995) that a financial instrument's fair value – i.e., its exit value – may not adequately capture the value of the instrument to the entity that owns it. When an asset's value-in-use departs significantly from its exit value because of value interdependence, fair value will be less informative to investors who are using the information to value the entity's equity.

4.2. Manipulation of model inputs

Having to rely on managers' estimates of asset and liability fair values introduces the general problem of informational asymmetry.²³ That is, in the case of Level 3 fair value estimates, managers have private information regarding appropriate values to select for model inputs as well the true

underlying economic value of an asset (or liability) to the firm.²⁴ Informational asymmetry creates two somewhat different problems, adverse selection and moral hazard.

An important implication of adverse selection is that the market will tend to value apparently similar, but different, assets held by two firms similarly when assessing their fair values and the values of the firms' equities. Thus, for example, in the absence of credible and verifiable information, two property investment firms that are otherwise equivalent except one has a higher quality portfolio of investments than the other will have their stocks valued similarly by the securities market. How can the firm with the higher quality portfolio of investments signal its fair value estimates are a more reliable indicator of economic value? One solution is for the firm to sell a portion of its portfolio to establish that the selling price is close to the fair value estimate of the property sold. Another solution is to permit the firm to disclose its valuation assumptions, the quality of which can be verified by others. For example, the firm can select a high cost external appraiser to value its properties. Both of these solutions illustrate the same point: for the signal to be credible, it must be costly, but less costly for the property investment firm with the higher quality investment portfolio. The investment firm with the lower quality portfolio could mimic the actions of the higher quality firm, but doing so would be more costly as the market would learn its portfolio of investments was of lower quality.²⁵

The problem of moral hazard is that managers will tend to use their private information to their personal advantage by manipulating the information that they disclose to the securities markets and regulators. For example, under a fair value measurement regime, managers have the incentive to value assets upward to increase income and their bonus-based compensation, and to time any impairments or upward revaluation reversals to minimise the effect on their compensation, e.g., in a period when the firm's income is otherwise depressed and the manager will not get any bonus re-

gardless. This is the so-called 'big bath' problem.

As noted above, the findings in Aboody et al. (2006), which indicate that managers select model parameters to manage estimates of disclosed employee stock option fair values, raise the broader question of whether managers will behave similarly when selecting model parameters for fair value estimates of other financial instruments, including those whose values are recognised in the body of the financial statements. The Barth et al. (1998) conclusion that managers can provide better estimates of bond fair values because they have access to private information, presumes implicitly that managers apply their private information in a neutral fashion – i.e., they do not succumb to the temptation to manipulate bond fair value estimates for private gain.

If fair value accounting for financial instruments or non-financial assets is generally applied for financial statement recognition, accounting standard-setters and securities regulators face the challenge of determining how much latitude to give managers when they estimate fair values, balancing the benefit of permitting managers to reveal private information, thereby mitigating the adverse selection problem, and the moral hazard cost of their exercising discretion to manipulate earnings and balance sheet ratios that affect contracting relationships with lenders and, in the case of financial institutions, financial statement-based regulatory capital used by bank regulators interested in stability of the banking system.

Although the securities market tends to act as a disciplinary force to keep firms and its managers honest, it does so with a lag. One solution advanced here to the problem of balancing the adverse selection and moral hazard problems is to require extensive disclosure of the underlying assumptions used when estimating fair values, whether the fair value estimates be Level 1, 2, or 3. For example, in the case of Level 2 estimates, investors should be provided with sufficient information to determine which assets or liabilities are used as a basis for comparison. In the case of Level 3 estimates, investors should have access to all relevant model inputs. The FASB appears to require ample disclosure in SFAS 157. For example, regarding Level 3 estimates the FASB (FASB, 2006a, p. 12, para. 32) requires that 'the reporting entity shall disclose information that enables users of its financial statements to assess the inputs used to develop those measurements and for recurring fair value measurements using significant unobservable inputs (Level 3).' Whether investors find SFAS 157 disclosures to be useful in assessing the relevance and reliability of the firms' fair value estimates is an empirical matter that will undoubtedly be the subject of much future study by accounting researchers.

²⁴ Managers also have private information regarding appropriate Level 1 or Level 2 fair value estimates (see discussion of Cotter and Richardson, 2002, in footnote 22).

²⁵ One can view the election of fair value or historical cost (with impairment) measurement that was permitted under UK GAAP as an opportunity for higher quality firms to signal their quality through the selection of fair value. For example, suppose both a high quality and low quality property investment firm selected fair value measurement and revalued their assets by the same amount. The firm with the lower quality property investment portfolio would be more likely to reverse the revaluation in future years, which would hurt the firm's credibility with the financial markets, thereby reducing its incentive to revalue its assets, and possibly avoid election of fair value measurement.

4.3. Fair values measurement error

One problem that remains even in the absence of managerial manipulation of fair value estimates is that fair value estimates of assets and liabilities are likely to contain measurement error. If the findings in Barth et al. (1995) relating to banks' investment securities generalises to other bank assets and liabilities, implementation of a full fair value model for recognition of financial instruments at fair value could yield unrecognised gains/losses that could cause earnings (and, in the case of banks, regulatory capital) to be more volatile than earnings based on the current historical cost model. This would be expected to occur particularly if measurement error in assets' fair values – which is likely to be positively correlated across assets – is not fully offset by measurement error in bank liabilities' fair values.

Of course, not all earnings volatility arising from the application of fair value accounting is the result of measurement error. Barth (2004) makes the observation that there are three primary sources of 'extra' volatility associated with fair value-based accounting amounts relative to those determined under historical cost. The first is true underlying economic volatility that is reflected by changes in the fair value of assets and liabilities. The second is volatility induced by measurement error in estimates of those fair value changes. The third, induced volatility arising from using a mixed-attribute model, would be less of a concern if all instruments are recognised at fair value, or if a firm elects the fair value option that is permitted under IAS 39.

Before leaving the discussion of measurement error, it is important to note that although fair value estimates of assets and liabilities likely contain measurement error relative to true economic values, so do historical cost-based book value estimates.²⁶ The key question for policy makers and academic researchers alike is whether fair value-based financial statements improve information investors receive relative to information provided by historical cost-based financial statements. The overall conclusion from the research I review is that investors do indeed benefit from having access to fair value information.

5. Concluding remarks

This paper reviews the extant capital market literature that examines the usefulness of fair value accounting information to investors. In doing so, I highlight findings that are of interest not just to academic researchers, but also to practitioners and standard-setters as they assess how current fair value standards require modification, and issues

future standards need to address. Taken together, the research findings suggest that disclosed and recognised fair values are informative to investors, but that the level of informativeness is affected by the amount of measurement error and source of the estimates – management or external appraisers. I also provide a discussion of implementation issues of determining asset and liability fair values.

Fortunately for academic accounting researchers, the IASB and FASB continue to issue standards relating to fair value measurement, disclosure, and recognition, providing ample opportunity for future research. Findings from extant studies of firms in the US, UK, and Australian capital markets suggest that investors are provided with information that is somewhat reliable and relevant. Whether relevance and reliability of asset and liability fair values improves with the new measurement and disclosure standards and with fair value recognition extended to a broader set of assets and liabilities than has been the case to date remains to be seen. In addition, because standards issued by the IASB either are or will be required to be adopted by firms in a great number of countries around the world, researchers will have an opportunity to examine how the relevance and reliability of disclosed and recognised fair value amounts vary across the many countries, where depth of markets for assets and liabilities and other institutional features that can affect fair value estimates are likely to differ.

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²⁶ As noted above (footnote 23), historical cost-based estimates are also subject to managerial discretion.

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Discussion of 'Is fair value accounting information relevant and reliable? Evidence from capital market research'

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Professor Landsman's paper concludes that disclosed and recognised fair values are informative to investors, but that the level of informativeness is affected by (1) the degree of measurement error and (2) the source of the estimates - management or external, although the research findings are not entirely consistent on this point. The evidence in the paper relates to a large number of assets and liabilities, mainly financial instruments, but some others as well, and reflects both US and international experience.

I am not surprised by these findings. For reasons that I shall explain, I would expect there to be some information content in the disclosures about fair value that are available at the moment, and I would also expect this to be less so if measurements are unreliable or potentially biased.

The paper has prompted various questions in my mind from a practical perspective as a user of accounting information. First, is fair value information more relevant in some sectors than in others? Some of the studies are sector-specific. I would expect fair value information to vary in relevance depending on sector. There is a limited number of sectors for which price-to-book measures are widely used for valuation purposes, and therefore I would expect fair value information for balance sheet items to be more value relevant in these sectors. The paper does not address this, and it would be helpful to know whether it helps to explain any of the research findings.

Second, is fair value information - that is, current exit values - more useful for some assets and liabilities than for others? I would expect the extent of usefulness of fair value information to depend on the types of assets and liabilities. Again, I do not think it is clear from the analysis in the paper whether this is the case, and it would be helpful to know the answer.

We need to think about how the information is

used in practice by users of accounts. Most, or at least many, analysts use a discounted cash flow valuation approach. They will estimate future sales, future operating costs, the fundamentals of the core business, typically to arrive at an EBIT-DA figure (or something similar), which is then adjusted for expected working capital movements, forecast capital expenditure, tax, and so on. These cash flows are then discounted back to a present value in order to value the core enterprise. But the next step is to think about all the non-core items and other sources of financing, in order to arrive at an equity value. This will frequently involve adjusting for the value of investments, associates, minority interest share of the business, options outstanding, pension fund deficits and so on. Most analysts will base these adjustments on current market values, where these are known.

There are therefore some fair value measurements that investors routinely incorporate into their company valuations, though not necessarily relying on information in the accounts. So it is not surprising that some fair values are directly relevant. However, it is harder to see how knowing the fair values (the exit values) of some of the specific operating assets and liabilities that generate the future cash flows helps in forecasting those cash flows. This information does not appear to be predictive. It would therefore be useful to know more about where fair value is most useful in practice - in terms of different types of assets and liabilities.

Third, although the paper's conclusion is that fair value information is value relevant, should we therefore conclude that the use of fair value should be extended to a broader range of assets and liabilities? The paper does not address this point, but it would be a natural conclusion that if fair value information is value relevant, then we should think about expanding its use.

On this point, I would urge some caution. The fair values that we have to date have been given, unsurprisingly, where the information previously was particularly inadequate or problematic. There has been a selection. Accounting standard setters

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have required the measurement and disclosure of those fair values that might in general be more helpful. When we are thinking about the kind of fair value information that we get at present – employee options expense, derivatives, fair values of pension assets – in the past the information for these items was wholly inadequate. So the case for fair value for some of these items is relatively clear-cut. The fair value information would only have to be a little bit relevant and a little bit reliable to be more useful than the alternatives. When we are thinking of replacing historical cost information that is *not* seen to be so problematic with fair value, it is much harder to justify – the bar is that much higher.

The issue is not just that fair values, particularly of the level 2 or level 3 variety (to use the terminology of SFAS 157), are less reliable or that there are problems about reliability. Clearly, this is an important issue, but there is another question about the impact on the usefulness of the profit and loss account. Investors want earnings to mean something, and we have a problem with the mixed model – particularly with any extension of the use of fair values. This is not just my opinion. A PricewaterhouseCoopers survey¹ finds ‘pervasive concerns [among investment professionals] about the adoption of any form of current value meas-

urement for illiquid assets and many liabilities’.

Professor Landsman’s paper prompts another question. Many of the studies cited in it deal with the *disclosure* of fair values rather than information based on recognition – for example, employee stock options before they were required to be expensed at fair value. I believe that employee options should be expensed with recognition at fair value, but it is interesting that the research shows that the market seems to be relatively efficient in taking purely disclosed information. This is an important point to bear in mind when we consider possible expansion of the use of fair values. What has to be recognised, and what can just be disclosed? This is also a question where there seems to be a need for further research.

In summary, there are some major questions that the research to date does not appear to have addressed, particularly in identifying where fair value information is more useful and where it can be more helpful. Does it depend on the sector? Or does it depend on the assets and liabilities? And how far can the benefits of fair value information be obtained by disclosure rather than recognition?

¹ PricewaterhouseCoopers, *Measuring Assets and Liabilities: Investment Professionals’ Views*. London, February 2007.

of timing asset sales for income management purposes.^{16,17}

One interesting study of Danish banks, Bernard et al. (1995), focuses on the impact of fair value accounting on bank regulatory capital as opposed to the value relevance of fair values for investors. Denmark is an interesting research setting because Danish bank regulators have used mark-to-market accounting to measure regulatory capital for a long period of time. Bernard et al. (1995) find that although there is evidence of earnings management, there is no reliable evidence that 'mark-to-market' numbers are managed to avoid regulatory capital constraints.¹⁸ In addition, when compared to US banks, Danish banks' mark-to-market net equity book values are more reliable estimates of their equity market values, thereby providing indirect evidence that fair value accounting could be beneficial to US investors and depositors.¹⁹

3.3. US-based stock option research

As noted above, estimates of employee stock options fair values have been required to be disclosed for several years under SFAS No. 123. Several studies examine the value relevance of such disclosures, including Bell et al. (2002), Aboody et al. (2004), and Landsman et al. (2006). Findings in Bell et al. (2002) differ somewhat from those in Aboody et al. (2004), although both studies provide evidence that employee option expense is value relevant to investors. Landsman et al. (2006)

provide theoretical and empirical support for measuring the fair value of employee stock option grants beyond grant date, with changes in fair value recognised in income along with amortisation of grant date fair value.

Because quoted prices for employee stock options typically are not available because of non-tradability provisions, the fair value estimates are based on models that rely on inputs selected by reporting firms. Aboody et al. (2006) find evidence that firms select model inputs so as to manage the pro forma income number disclosed in the employee stock option footnote. This finding is potentially relevant to accounting standard-setters as well as bank regulators in that it is additional evidence that managers facing incentives to manage earnings are likely to do so when fair values must be estimated using entity-supplied estimates of values or model inputs if quoted prices for assets or liabilities are not readily available.²⁰ If managers have the incentive to use discretion when estimating fair values of on- and off-balance sheet asset and liability amounts when such values are not recognised in the financial statements, it is reasonable to assume the incentive will only increase if fair value accounting is used for recognition of amounts on the balance sheet and in the income statement.

4. Fair value implementation issues

Estimating fair value, i.e., exit value, for assets and liabilities is relatively easy if they are actively traded in liquid markets. The problem becomes more complicated if active markets do not exist, which is why the FASB offers Level 2 and Level 3 estimation categories in SFAS 157. Although absence of active markets is an obvious problem for non-financial assets, the problem is no less obvious for financial instruments, particularly if the financial instrument is a compound instrument comprising several embedded option-like features, values for which depend on inter-related default and price risk characteristics.

In this section, I discuss issues relating to implementation of fair value estimates when market prices for particular financial instruments are not readily available by focusing on findings from two related studies by Barth et al. (1998, 2000) on the use of binomial option pricing models to estimate fair values for corporate debt and its components. The issues I discuss should provide some insights to the FASB and IASB regarding the relevance and reliability of Level 3 fair value estimates.

4.1. Binomial option pricing of corporate debt

Barth et al. (1998) uses a binomial option pricing model to estimate the fair values of corporate debt and its components, i.e., conversion, call, put, and sinking fund features, to provide evidence on

¹⁶ In another study using the same sample of firms as that used in Muller and Riedl (2002), Dietrich et al. (2001) find that UK investment property firms in the pre-1993 period appear to select the valuation approach – historical cost or fair value – that results in smoother earnings. Because post-1993 UK firms were required to disclose income from property sales separately on the income statement, the authors interpret this as evidence that changes in disclosure requirements altered manager's use of property sales to smooth earnings. Dietrich et al. (2001) also find evidence that property appraisal estimates of fair value better reflect asset selling prices than historical costs, and interpret this as evidence consistent with greater reliability of fair value estimates, at least with respect to assets that are ultimately disposed.

¹⁷ See Lin and Peasnell (2000) for a discussion of managerial strategic considerations in the timing asset revaluations. The study provides evidence that firms appear to time asset revaluations to offset the effects of so-called equity depletion arising from immediate write-off of goodwill.

¹⁸ The ability to mark-to-market an asset suggests the existence of a reasonably liquid market for the asset. From this perspective, mark-to-market values can be viewed as approximating Level 1 or Level 2 fair value estimates.

¹⁹ Bernard et al. (1995) caution that drawing inferences from the Danish experience with fair value accounting for banks regarding the benefits of requiring fair value accounting for US banks is subject to many caveats. These include differences in the relative size of the US and Danish banking sectors, as well as relative differences in US and Danish banking regulatory systems.

²⁰ See also the discussion above of the Barth et al. (1996) findings relating to loans fair values estimates by banks with lower regulatory capital.

the relevance and reliability of estimated fair values. A companion study, Barth et al. (2000), describes details of how the binomial model is implemented. The 1998 empirical study is based on data from 1990 for a sample of 120 publicly traded US firms that have corporate debt with multiple embedded option features. The binomial model the study implements is based on the models of Cox et al. (1979) and Rendleman and Bartter (1979), and considers directly only default risk, but includes information in the interest rate yield curve.

Findings from Barth et al. (1998) reveal component value estimates are relevant in that they represent large fractions of estimated total bond fair value. In addition, implementing a fundamental components approach in which call options are classified as assets, conversion options as equity, and put options as debt, indicates there are material changes to recognised balance sheet accounts and debt-to-equity ratios for sample firms.²¹ The study also finds that estimates of component fair values depend on whether a bond has multiple features. For example, the value of the conversion feature for a convertible, callable bond depends on the value of the call feature and vice versa. In addition, because components' values are interdependent, the order in which components are considered when estimating each bond's total fair value can materially affect each component's estimated fair value. This issue is particularly important if a fundamental components approach is used for separate recognition of bond components as assets, liabilities, and equity.

²¹ See FASB (1990, 2000) for a description of the fundamental components approach to accounting for complex financial instruments. In addition to the FASB, several other standard-setters have considered or require separating compound financial instruments into components, including the CICA (Section 3860 of the *CICA Handbook*, 'Financial Instruments – Disclosure and Presentation') and the AASB (AASB Accounting Standard 1033, *Presentation and Disclosure of Financial Instruments*). Under the revised version of IAS 32 (IASB, 2003a), firms that issue compound financial instruments with debt and equity components must account for, and present separately, the components according to their substance based on the definitions of liability and equity.

²² Relatedly, as noted above, Cotter and Richardson (2002) also suggest managers have superior information about non-investment property values and therefore rely on director estimates of fair value rather than appraisals for these assets. However, this does not preclude requiring managers to disclose assumptions they make as inputs to the valuation process.

²³ This is not to suggest that informational asymmetry is peculiar to fair value estimation by managers. Informational asymmetry arises in accounting whenever managers have discretion regarding the timing or amount of non-market adjustments to amounts arising from past transactions, e.g., allowances bad debt, allowances for loan losses, and impairment charges.

However, additional evidence in Barth et al. (1998) suggests model estimates of total bond value may lack reliability. In particular, when the authors re-estimate bond fair values excluding from the sample those bonds with available market prices (such bonds comprise approximately half of sample bonds), estimated bond values for those bonds that are not publicly traded differ significantly from value estimates when all bonds are included in the estimation procedure. This finding suggests that financial instruments' fair value estimates are sensitive to whether actual market price information from other instruments an entity has on its balance sheet is available for use as model inputs.

Barth et al. (1998) reach several conclusions regarding limitations to implementation of binomial option pricing models for estimating bond fair values that generalise to all financial instruments issued or held by an entity. First, the authors had to make several educated guesses for values of model inputs (e.g., conversion schedules and equity volatility). In principle, managers of the reporting entities likely have access to better information than financial statement users (including academic researchers), and the authors suggest that fair value estimates could improve if firms were required to disclose them.²² Second, models quickly become too complex and difficult to implement if they are to incorporate all of the dimensions of risk and value that can affect an instrument's fair value. For example, presently, few models consider both interest rate and default risk. In addition, financial instruments' fair values are interdependent. For example, the fair value of one debt instrument issued by an entity is dependent upon actions that holders of another debt instrument issued by that entity can take. The model Barth et al. (1998) implement considers some sources of bond value interdependence (e.g., debt priority) but basically ignores the issue because of its complexity. The issue of financial instruments' value interdependence is another illustration of the issue raised by Barth and Landsman (1995) that a financial instrument's fair value – i.e., its exit value – may not adequately capture the value of the instrument to the entity that owns it. When an asset's value-in-use departs significantly from its exit value because of value interdependence, fair value will be less informative to investors who are using the information to value the entity's equity.

4.2. Manipulation of model inputs

Having to rely on managers' estimates of asset and liability fair values introduces the general problem of informational asymmetry.²³ That is, in the case of Level 3 fair value estimates, managers have private information regarding appropriate values to select for model inputs as well the true

underlying economic value of an asset (or liability) to the firm.²⁴ Informational asymmetry creates two somewhat different problems, adverse selection and moral hazard.

An important implication of adverse selection is that the market will tend to value apparently similar, but different, assets held by two firms similarly when assessing their fair values and the values of the firms' equities. Thus, for example, in the absence of credible and verifiable information, two property investment firms that are otherwise equivalent except one has a higher quality portfolio of investments than the other will have their stocks valued similarly by the securities market. How can the firm with the higher quality portfolio of investments signal its fair value estimates are a more reliable indicator of economic value? One solution is for the firm to sell a portion of its portfolio to establish that the selling price is close to the fair value estimate of the property sold. Another solution is to permit the firm to disclose its valuation assumptions, the quality of which can be verified by others. For example, the firm can select a high cost external appraiser to value its properties. Both of these solutions illustrate the same point: for the signal to be credible, it must be costly, but less costly for the property investment firm with the higher quality investment portfolio. The investment firm with the lower quality portfolio could mimic the actions of the higher quality firm, but doing so would be more costly as the market would learn its portfolio of investments was of lower quality.²⁵

The problem of moral hazard is that managers will tend to use their private information to their personal advantage by manipulating the information that they disclose to the securities markets and regulators. For example, under a fair value measurement regime, managers have the incentive to value assets upward to increase income and their bonus-based compensation, and to time any impairments or upward revaluation reversals to minimise the effect on their compensation, e.g., in a period when the firm's income is otherwise depressed and the manager will not get any bonus re-

gardless. This is the so-called 'big bath' problem.

As noted above, the findings in Aboody et al. (2006), which indicate that managers select model parameters to manage estimates of disclosed employee stock option fair values, raise the broader question of whether managers will behave similarly when selecting model parameters for fair value estimates of other financial instruments, including those whose values are recognised in the body of the financial statements. The Barth et al. (1998) conclusion that managers can provide better estimates of bond fair values because they have access to private information, presumes implicitly that managers apply their private information in a neutral fashion – i.e., they do not succumb to the temptation to manipulate bond fair value estimates for private gain.

If fair value accounting for financial instruments or non-financial assets is generally applied for financial statement recognition, accounting standard-setters and securities regulators face the challenge of determining how much latitude to give managers when they estimate fair values, balancing the benefit of permitting managers to reveal private information, thereby mitigating the adverse selection problem, and the moral hazard cost of their exercising discretion to manipulate earnings and balance sheet ratios that affect contracting relationships with lenders and, in the case of financial institutions, financial statement-based regulatory capital used by bank regulators interested in stability of the banking system.

Although the securities market tends to act as a disciplinary force to keep firms and its managers honest, it does so with a lag. One solution advanced here to the problem of balancing the adverse selection and moral hazard problems is to require extensive disclosure of the underlying assumptions used when estimating fair values, whether the fair value estimates be Level 1, 2, or 3. For example, in the case of Level 2 estimates, investors should be provided with sufficient information to determine which assets or liabilities are used as a basis for comparison. In the case of Level 3 estimates, investors should have access to all relevant model inputs. The FASB appears to require ample disclosure in SFAS 157. For example, regarding Level 3 estimates the FASB (FASB, 2006a, p. 12, para. 32) requires that 'the reporting entity shall disclose information that enables users of its financial statements to assess the inputs used to develop those measurements and for recurring fair value measurements using significant unobservable inputs (Level 3).' Whether investors find SFAS 157 disclosures to be useful in assessing the relevance and reliability of the firms' fair value estimates is an empirical matter that will undoubtedly be the subject of much future study by accounting researchers.

²⁴ Managers also have private information regarding appropriate Level 1 or Level 2 fair value estimates (see discussion of Cotter and Richardson, 2002, in footnote 22).

²⁵ One can view the election of fair value or historical cost (with impairment) measurement that was permitted under UK GAAP as an opportunity for higher quality firms to signal their quality through the selection of fair value. For example, suppose both a high quality and low quality property investment firm selected fair value measurement and revalued their assets by the same amount. The firm with the lower quality property investment portfolio would be more likely to reverse the revaluation in future years, which would hurt the firm's credibility with the financial markets, thereby reducing its incentive to revalue its assets, and possibly avoid election of fair value measurement.

4.3. Fair values measurement error

One problem that remains even in the absence of managerial manipulation of fair value estimates is that fair value estimates of assets and liabilities are likely to contain measurement error. If the findings in Barth et al. (1995) relating to banks' investment securities generalises to other bank assets and liabilities, implementation of a full fair value model for recognition of financial instruments at fair value could yield unrecognised gains/losses that could cause earnings (and, in the case of banks, regulatory capital) to be more volatile than earnings based on the current historical cost model. This would be expected to occur particularly if measurement error in assets' fair values – which is likely to be positively correlated across assets – is not fully offset by measurement error in bank liabilities' fair values.

Of course, not all earnings volatility arising from the application of fair value accounting is the result of measurement error. Barth (2004) makes the observation that there are three primary sources of 'extra' volatility associated with fair value-based accounting amounts relative to those determined under historical cost. The first is true underlying economic volatility that is reflected by changes in the fair value of assets and liabilities. The second is volatility induced by measurement error in estimates of those fair value changes. The third, induced volatility arising from using a mixed-attribute model, would be less of a concern if all instruments are recognised at fair value, or if a firm elects the fair value option that is permitted under IAS 39.

Before leaving the discussion of measurement error, it is important to note that although fair value estimates of assets and liabilities likely contain measurement error relative to true economic values, so do historical cost-based book value estimates.²⁶ The key question for policy makers and academic researchers alike is whether fair value-based financial statements improve information investors receive relative to information provided by historical cost-based financial statements. The overall conclusion from the research I review is that investors do indeed benefit from having access to fair value information.

5. Concluding remarks

This paper reviews the extant capital market literature that examines the usefulness of fair value accounting information to investors. In doing so, I highlight findings that are of interest not just to academic researchers, but also to practitioners and standard-setters as they assess how current fair value standards require modification, and issues

future standards need to address. Taken together, the research findings suggest that disclosed and recognised fair values are informative to investors, but that the level of informativeness is affected by the amount of measurement error and source of the estimates – management or external appraisers. I also provide a discussion of implementation issues of determining asset and liability fair values.

Fortunately for academic accounting researchers, the IASB and FASB continue to issue standards relating to fair value measurement, disclosure, and recognition, providing ample opportunity for future research. Findings from extant studies of firms in the US, UK, and Australian capital markets suggest that investors are provided with information that is somewhat reliable and relevant. Whether relevance and reliability of asset and liability fair values improves with the new measurement and disclosure standards and with fair value recognition extended to a broader set of assets and liabilities than has been the case to date remains to be seen. In addition, because standards issued by the IASB either are or will be required to be adopted by firms in a great number of countries around the world, researchers will have an opportunity to examine how the relevance and reliability of disclosed and recognised fair value amounts vary across the many countries, where depth of markets for assets and liabilities and other institutional features that can affect fair value estimates are likely to differ.

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²⁶ As noted above (footnote 23), historical cost-based estimates are also subject to managerial discretion.

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Discussion of 'Is fair value accounting information relevant and reliable? Evidence from capital market research'

Sarah Deans*

Professor Landsman's paper concludes that disclosed and recognised fair values are informative to investors, but that the level of informativeness is affected by (1) the degree of measurement error and (2) the source of the estimates - management or external, although the research findings are not entirely consistent on this point. The evidence in the paper relates to a large number of assets and liabilities, mainly financial instruments, but some others as well, and reflects both US and international experience.

I am not surprised by these findings. For reasons that I shall explain, I would expect there to be some information content in the disclosures about fair value that are available at the moment, and I would also expect this to be less so if measurements are unreliable or potentially biased.

The paper has prompted various questions in my mind from a practical perspective as a user of accounting information. First, is fair value information more relevant in some sectors than in others? Some of the studies are sector-specific. I would expect fair value information to vary in relevance depending on sector. There is a limited number of sectors for which price-to-book measures are widely used for valuation purposes, and therefore I would expect fair value information for balance sheet items to be more value relevant in these sectors. The paper does not address this, and it would be helpful to know whether it helps to explain any of the research findings.

Second, is fair value information - that is, current exit values - more useful for some assets and liabilities than for others? I would expect the extent of usefulness of fair value information to depend on the types of assets and liabilities. Again, I do not think it is clear from the analysis in the paper whether this is the case, and it would be helpful to know the answer.

We need to think about how the information is

used in practice by users of accounts. Most, or at least many, analysts use a discounted cash flow valuation approach. They will estimate future sales, future operating costs, the fundamentals of the core business, typically to arrive at an EBIT-DA figure (or something similar), which is then adjusted for expected working capital movements, forecast capital expenditure, tax, and so on. These cash flows are then discounted back to a present value in order to value the core enterprise. But the next step is to think about all the non-core items and other sources of financing, in order to arrive at an equity value. This will frequently involve adjusting for the value of investments, associates, minority interest share of the business, options outstanding, pension fund deficits and so on. Most analysts will base these adjustments on current market values, where these are known.

There are therefore some fair value measurements that investors routinely incorporate into their company valuations, though not necessarily relying on information in the accounts. So it is not surprising that some fair values are directly relevant. However, it is harder to see how knowing the fair values (the exit values) of some of the specific operating assets and liabilities that generate the future cash flows helps in forecasting those cash flows. This information does not appear to be predictive. It would therefore be useful to know more about where fair value is most useful in practice - in terms of different types of assets and liabilities.

Third, although the paper's conclusion is that fair value information is value relevant, should we therefore conclude that the use of fair value should be extended to a broader range of assets and liabilities? The paper does not address this point, but it would be a natural conclusion that if fair value information is value relevant, then we should think about expanding its use.

On this point, I would urge some caution. The fair values that we have to date have been given, unsurprisingly, where the information previously was particularly inadequate or problematic. There has been a selection. Accounting standard setters

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have required the measurement and disclosure of those fair values that might in general be more helpful. When we are thinking about the kind of fair value information that we get at present – employee options expense, derivatives, fair values of pension assets – in the past the information for these items was wholly inadequate. So the case for fair value for some of these items is relatively clear-cut. The fair value information would only have to be a little bit relevant and a little bit reliable to be more useful than the alternatives. When we are thinking of replacing historical cost information that is *not* seen to be so problematic with fair value, it is much harder to justify – the bar is that much higher.

The issue is not just that fair values, particularly of the level 2 or level 3 variety (to use the terminology of SFAS 157), are less reliable or that there are problems about reliability. Clearly, this is an important issue, but there is another question about the impact on the usefulness of the profit and loss account. Investors want earnings to mean something, and we have a problem with the mixed model – particularly with any extension of the use of fair values. This is not just my opinion. A PricewaterhouseCoopers survey¹ finds ‘pervasive concerns [among investment professionals] about the adoption of any form of current value meas-

urement for illiquid assets and many liabilities’.

Professor Landsman’s paper prompts another question. Many of the studies cited in it deal with the *disclosure* of fair values rather than information based on recognition – for example, employee stock options before they were required to be expensed at fair value. I believe that employee options should be expensed with recognition at fair value, but it is interesting that the research shows that the market seems to be relatively efficient in taking purely disclosed information. This is an important point to bear in mind when we consider possible expansion of the use of fair values. What has to be recognised, and what can just be disclosed? This is also a question where there seems to be a need for further research.

In summary, there are some major questions that the research to date does not appear to have addressed, particularly in identifying where fair value information is more useful and where it can be more helpful. Does it depend on the sector? Or does it depend on the assets and liabilities? And how far can the benefits of fair value information be obtained by disclosure rather than recognition?

¹ PricewaterhouseCoopers, *Measuring Assets and Liabilities: Investment Professionals’ Views*. London, February 2007.

Financial reporting quality: is fair value a plus or a minus?

Stephen H. Penman*

Recent deliberations by both the International Accounting Standards Board (IASB) and the Financial Accounting Standard Board (FASB) in the United States have focused on how fair values of assets and liabilities should be measured. The issue of *when*, rather than *how*, fair value measurement should be applied is still far from resolved, however. Fair values have been mandated for some assets and liabilities under both IASB and FASB standards, but it is fair to say that principles governing the applicability of fair values have yet to be articulated: when is fair value accounting appropriate and when is it not? Or, in terms of my charge for this paper, under what circumstances is fair value a plus or a minus?

To prepare for my task, I made a survey of public statements made for and against fair value accounting by a variety of standard setters, regulators, analysts, and preparers. The stated ‘minuses’ typically point to the dangers of fair value estimates from marking to model rather than marking to market, concerns about introducing ‘excess volatility’ into earnings, and feedback effects (on banks’ lending practices, for example) that could damage a business and, indeed, heighten systematic risk. A few antagonists question whether fair values (for bank assets and liabilities, for example) really capture the economics of a business (in fostering core deposits and making loans). In counterpoint, the proponents of fair value argue that fair value is a superior economic measure to historical cost. Consider the following arguments, often advanced as ‘pluses’:

- Investors are concerned with value, not costs, so report fair values.

- With the passage of time, historical prices become irrelevant in assessing an entity’s current financial position. Prices provide up-to-date information about the value of assets.
- Fair value accounting reports assets and liabilities in the way that an economist would look at them; fair values reflect true economic substance.
- Fair value accounting reports economic income: in accordance with the widely accepted Hicksian definition of income as a change in wealth, the change in fair value of net assets on the balance sheet yields income. Fair value accounting is a solution to the accountant’s problem of income measurement, and is to be preferred to the hundreds of rules underlying historical cost income.
- Fair value is a market-based measure that is not affected by factors specific to a particular entity; accordingly it represents an unbiased measurement that is consistent from period to period and across entities.

So self-evident do these points seem to be that fair value accounting is often just presumed to be ‘more relevant’. The words, ‘fair value’ sound good (who could be against ice-cream and fair value?!) while ‘historical cost’ sounds, well, *passé*. As it turns, out, however, each of these statements becomes qualified under scrutiny. Can economic argument lead to constructive arguments for implementing fair value accounting?

1. Some preliminaries

Pluses and minuses can only be evaluated against an alternative, so I will take the approach of asking if (or under what conditions) fair value accounting is an improvement over historical cost accounting. In discussions about fair value, people often proceed at cross-purposes, so a few points need to be clear before we proceed.

1.1. What is fair value?

Three notions of fair value accounting enter the discussion, and one must be clear which is being entertained.

*The author is at the Graduate School of Business, Columbia University, shp38@columbia.edu This paper draws on some of the themes in a White Paper prepared for the Center for Excellence in Accounting and Security Analysis (CEASA) at Columbia Business School. See D. Nissim and S. Penman, *The Boundaries of Fair Value Accounting*, White Paper No. 2 (Center for Excellence in Accounting and Security Analysis, Columbia University, 2007). Comments received at the *Information for Better Markets Conference* have been helpful as has a close reading of the manuscript by Martin Walker and Pauline Weetman.

1. Fair value variously applied in a 'mixed attribute model':

In this treatment, fair value is used alternatively with historical cost for the same asset or liability but at different times; the accounting is primarily historical cost accounting, but fair values are applied under certain conditions. Examples are fair values applied in fresh-start accounting (that then proceeds under historical cost accounting), impairment from historical cost to fair value (really a form of fresh-start accounting), using fair values to establish historical cost (for barter transactions and donations, for example) or in the allocation of purchase price (between goodwill and tangible assets, for example), and reference to fair value to discipline estimates under historical cost accounting.

2. Fair value continually applied as entry value:

Assets are revalued at their replacement cost, with current costs then recorded in the income statement, with unrealised (holding) gains and losses also recognised. Revenue recognition and matching is maintained but income, based on current costs, is said to be a better indicator of the future and not path-dependent.

3. Fair value continually applied as exit value:

Assets and liabilities are remarked each period to current exit price, with unrealised gains and losses from the remarking recorded as part of (comprehensive) income.

The pluses and minuses of fair value in applica-

tions (1) and (2) can be debated, but note that both are really modified cost accounting; both maintain standard revenue recognition – applying exit prices to recognise value from business activity only on actual exit of the product or service to the market – but with modifications to the expense matching.¹ Application 3 applies exit values to continually remark assets and liabilities but without actual exit (realisation).

The FASB, in its recent Statement 157, *Fair Value Measurements* endorses fair value as exit value, with a seeming nod from the IASB subject to some minor reservations.²

'Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.'

While the IASB and FASB presumably envision exit values being applied to determine fair value in the mixed attribute model (1), I will limit my comments to fair value applied in (3).³ It is the recognition of exit values without an historical exit transaction that places this fair value accounting in such contrast to historical cost accounting. The top-line notion of revenue disappears, and income is simply the change in fair values on the balance sheet. Accordingly, the accounting issues are quite different. Continually remarking equity investments to fair value rather than using the equity method involves different issues from impairing equity method investments for a permanent loss under mixed attribute accounting. And so with marking inventories, core deposits, bank loans, insurance contracts, debt, and so on to fair value on a continual basis. 'Fair value accounting' as envisioned in application (3) is a potential shift in paradigm.⁴

1.2. Fair value to whom?

As with any policy issue, prescriptions cannot be made without an understanding of the objectives of the exercise. To whom are we reporting? Whose pluses and whose minuses? Different users may demand different accounting reports, and confusion reigns if issues are discussed at cross purposes. A shareholder might recognise a gain from a fall in the market value of debt as creditworthiness deteriorates, but not the creditor. Bank shareholders might wish to see bank deposits at fair value, but not the depositors. A bank regulator would also be concerned about reporting deposits at less than face value if such reporting affected depositors' confidence in the banking system. While an investor might welcome the information about volatility that fair value accounting reveals, not so a central banker who might be concerned about feedback effects on systematic risk. A bank regulator might be concerned about marking up banks'

¹ For example, impairment to fair value under application (1) fresh-starts the matching of expenses to future revenues when there is a downward revision in future revenues anticipated, that is, cost have expired. Application (2) matches current costs rather than historical costs to (current) revenues. FASB Statement 33 (now suspended) was an experiment with application (2), but those issues are not part of the current debate. See Statement of Financial Accounting Standards No. 33, *Financial Reporting and Changing Prices* (Norwalk, Conn.: FASB, September 1979).

² See Statement of Financial Accounting Standards No. 157, *Fair Value Measurements* (Norwalk, Conn.: FASB, September 2006), paras 5–15 and Discussion paper, *Fair Value Measurements Part 1: Invitation to Comment* (London: IASB, November 2006).

³ Statement 157 is explicit in stating that the standard deals with the measurement of fair value (when fair value measurements are applicable), not with the issue of when fair value measurements are applicable. IASB discussion documents have the same flavour. However, the application question is very much open and (presumably) part of the conceptual framework agenda.

⁴ Under application (3), some assets or liabilities might be carried at fair value (continually) while others are carried at historical cost (continually). So, marketable securities might be marked to market, with inventories at historical cost. This form of a 'mixed attribute model' differs from moving between fair value and historical cost for the same asset and liability.

capital during speculative times with the resulting incentive for profligate lending.⁵

In this talk, I take a shareholder perspective: what are the pluses and minuses of using fair value accounting (rather than historical cost accounting) for reporting to shareholders? This, I submit, is hardly controversial; the shareholders are the owners to whom management and auditors report. But it does mean that, if standard setters have a broader set of constituents in mind, with an objective of general purpose financial reporting, then they may see the issues differently.

1.3. My approach

Normative statements about accounting issues are often statements of the author's received wisdom combined with some a priori thinking: here is what I think about the matter, says the author, supported by some inductive and deductive logic. This approach, applied in the 'accounting theory' era of the 1950s to the 1970s, gave us numerous prescriptions but little resolution. It would be helpful to refer to concrete research results for answers, but theoretical and empirical research has not delivered a definite resolution either. Recent accounting-based valuation theory has given us some insight to which I will refer later. Empirical research (of the type discussed by Wayne Landsman) documents correlations between fair value measurements and stock prices that are useful for understanding whether fair values are 'relevant to investors'. But it does not give us much of a handle on the policy question of whether fair values should be reported in place of historical cost accounting (which, research shows, is also relevant to investors).⁶

My approach, I must confess, is largely a priori. But I hope to get some bite by taking what might be referred to as a demand approach. Accounting, as I see it, is a product and products are a matter of design. The design – and the quality of the product – should be judged on how well it serves the customer. So, with the customer identified as the shareholder (above), I ask which product features – fair value or historical cost – help (or frustrate) the customer. Unfortunately, inferring demand from statements made in the current regulatory environment is difficult, given that regulation affects behaviour. We do observe the voluntary application of fair value accounting (without the coercion of regulation) in some situations – unregulated hedge funds use fair value accounting, for example – and so we can defer to 'the market' for lessons. Such observations are limited, however, so I resort to a priori analysis. But I do so with an eye to the shareholder; I presume that shareholders require accounting information for two purposes:

1. *Valuation*. Shareholders use accounting information to inform them about the (fair) value of the equity: What is the equity worth?

2. *Stewardship*. Shareholders use accounting information to assess the stewardship of management, the owners' employees: How efficient have managers been in making investments and conducting operations to add value for shareholders?

More concretely, I force an orientation to practical tasks for which information is demanded: To what extent does fair value accounting aid or frustrate the tasks of equity valuation and monitoring managers' stewardship? This focus, also, is hardly controversial. The first task is that of the equity analyst, the second the pursuit of those involved in corporate governance on behalf of shareholders.

In view of the above, many of the points I make below are not particularly original. I want to be a little more analytical than simply listing the standard litany of complaints about and statements in favour of fair value accounting. But, in doing so, some well-worn points come to the surface. By presenting them in a more organised framework, my hope is that they will be more imperative.

1.4. Information for better markets

It is often said that financial reporting should have the objective of providing all relevant information to capital markets. So (it follows), if both historical cost information and fair values are relevant, both should be reported. Nothing here subtracts from that position (if one wants to adopt it). The issue is which measurement basis should go through the discipline of the accounting system to determine the summary, bottom-line numbers, earnings and book value on which investors and analysts focus (for whatever bounded rationality reason). Alternatives to the accounting information (within the system) can, of course, be supplied in footnotes, much like some fair value information is now disclosed.

2. The conceptual merits of fair value accounting versus historical cost accounting

As with most accounting issues, it is important to distinguish conceptual issues from those that have

⁵ Papers that deal with fair value from the view of the central banker and bank regulator include A. Enria et al., *Fair Value and Financial Stability* Occasional Paper Series No. 13, European Central Bank, April 2004; G. Plantin, H. Sapra, and H. Shin, 'Marking to market, liquidity, and financial stability', *Monetary and Economic Studies (Special Edition)*, October 2005; K. Burkhardt and R. Strausz, 'The effect of fair vs. book value accounting on banks', unpublished paper, Free University of Berlin, April 2004; and 'Fair value accounting for financial instruments: some implications for bank regulation', BIS Working paper No.209, August 2006.

⁶ Indeed, inferences from the empirical research are limited because stock prices, from which 'relevance' is inferred, are determined from information under current accounting practices, and those prices might be different under alternative practices.

to do with measurement. Here I 'conceptualise' how both fair value accounting and historical cost accounting would satisfy the valuation and stewardship goals of shareholder reporting, in principle (if measurement were no problem). I then overlay the concepts with measurement in Section 3.

2.1. The concepts behind fair value accounting

Putting aside measurement issues, fair value accounting conveys information about equity value and managements' stewardship by stating all assets and liabilities on the balance sheet as their value to shareholders.⁷

- the balance sheet becomes the primary vehicle for conveying information to shareholders;
- with all assets and liabilities recorded on the balance sheet at fair value, the book value of equity reports the value of equity (the Price/Book ratio = 1.0);
- the income (profit and loss) statement reports 'economic income' because it is simply the change in value over a period;
- following the economic principle that current changes in value do not predict future changes in value, earnings cannot forecast future earnings. But this is of no concern for valuation, because the balance sheet provides the valuation;
- (unexpected) earnings, being a shock to value, reports on the risk of the equity investment. Volatility in earnings is informative for value at risk;
- the P/E ratio is Price/Shock-to-value, that is, a realisation of value at risk (with a very different interpretation to that under historical cost);
- income reports the stewardship of management in adding value for shareholders.

In short, the balance sheet satisfies the valuation objective and the income statement provides information about risk exposure and management performance.

The accounting for investment funds – mutual funds and hedge funds – applies this strict fair value accounting, and investors are willing to trade in and out of these funds at book value ('net asset value') with the presumption that book value equals value (with no gains and losses between shareholders). Further, the income (returns) for these funds is accepted as a comprehensive measure of the fund managers' investment performance, both the investment success and the volatility to which investors have been subjected. The accounting is sufficient; one does not require a balanced scorecard.

2.2. The concepts behind historical cost accounting

Historical cost accounting is often misinterpreted in the debate, with the criticism that it reports a balance sheet with old, historical costs rather than current values. This statement is correct, but belies an understanding about how historical cost works for valuation and performance assessment. Under historical cost accounting,

- the income statement is the primary vehicle for conveying information about value to shareholders, not the balance sheet;
- earnings report how well the firm has performed in arbitrating prices in input (supplier) markets and output (customer) markets; that is, historical cost earnings reports the value-added buying inputs at one price, transforming them according to a business model, and selling them at another price;
- in contrast to fair value accounting, current income forecasts future income on which a valuation can be made;
- the P/B ratio is typically not equal to 1.0 and the P/E ratio takes current earnings as a base and multiplies it according to the forecast of future earnings;
- earnings do not report shocks to value, but shocks to trading in input and output markets;
- earnings measure the stewardship of management in arbitrating input and output markets, that is, in adding value in markets.

Historical cost accounting views value as generated in business by purchasing inputs (from suppliers), transforming them according to a business plan, and selling the consequent product (to customers) over cost; in short, value is added by arbitrating (entry and exit) prices in input and output markets for goods and services according to a business plan. Historical cost accounting does not report the (present) value of expected outcomes from the business plan. Rather, it reports on progress that has been made in executing the plan,

⁷ This idea is close to that of 'value in use' but with a focus on the shareholder rather than on the entity. The value-in-use concept (or its variant, 'deprival value') appears (for example) in Accounting Standards Board, *Statement of Principles for Financial Reporting* (London: ASB, 1999), Australian Accounting Research Foundation, *Accounting Theory Monograph No. 10, Measurement in Financial Accounting* (AARF, 1998) and has long been part of the discussion, for example in J. Horton and R. Macve, 'Fair value' for financial instruments: how erasing theory is leading to unworkable global accounting standards for performance reporting', *Australian Accounting Review* 10 (July 2000): 26–39 and R. Macve and G. Serafeim, "Deprival value" vs "fair value" measurement for contract liabilities in resolving the "revenue recognition" conundrum: towards a general solution'. Unpublished paper, London School of Economics, June 2006.

recognising value added (earnings) from actual transactions in the input and output markets being arbitrated. The income statement comes to the fore with a matching of revenues (value received from transactional exit prices) with costs (value surrendered in transactional input prices). The balance sheet is not a statement of values (for the large part), by design, but rather a by-product of this matching, with liabilities such as accrued expenses, deferred revenues, and deferred taxes gaining their legitimacy from the matching process rather than as representations of the value of obligations.

The term, 'historical cost' is unfortunately pejorative. A better term, one that captures the essence, is 'historical transactions accounting', for the accounting reports a history of transactions, and it is that history of engaging with markets from which valuations are made and management performance assessed.

3.3. The demand for fair values

A demand for fair values could be imputed if historical cost information is shown to be deficient for valuation and performance evaluation, with fair values providing the remedy. Here I compare the two for purposes of valuation.

To separate concepts from measurement issues, it is helpful to compare fair value accounting and historical cost accounting implemented in their ideal form. Ideal fair value accounting reports a book value that is sufficient to value a firm but earnings that are useless for the purpose. Ideal historical cost accounting produces a balance sheet that does not report value, but earnings that are sufficient to value a firm. Consider the following equity valuation model based on expected earnings (that is a legitimate one in valuation theory in the sense that it gives the same value as that based on expected dividends):

$$Value_t = \frac{Expected\ Earnings_{t+1}}{r} \quad (A)$$

Here r is the required return for the equity holders.

Under ideal fair value accounting, earnings are forecasted from the current book value:

$$Expected\ Earnings_{t+1} = r \times Book\ Value_t \quad (B)$$

That is, book value (ideally measured at fair value) is sufficient for forecasting earnings and for valuation. Under ideal historical cost accounting earnings are forecasted from current earnings:

$$Expected\ Earnings_{t+1} = Earnings_t \quad (C)$$

That is, current earnings (ideally measured) are sufficient for forecasting earnings and for valuation. In the parlance, current earnings indicate permanent earnings.⁸ Accordingly, under historical cost accounting equity value is determined by capitalising current earnings:

$$Value_t = \frac{Earnings_t}{r} \quad (D)$$

The lessons are:

1. It is not necessary to state the balance sheet at fair value to satisfy the valuation objective. Valuations can be made from the historical cost income statement.
2. Assuming that one knows the required equity return, there is no reason, *in principle*, to say that fair value accounting is better than historical cost accounting. The resolution must turn on how measurement strays from the ideal. Historical cost comes with considerable measurement issues; does fair value measurement provide a solution?
3. If one does not know the required return (and we don't!), fair value accounting has a distinct advantage. Valuation under historical cost accounting requires a required return (to convert earnings, a value flow, to a stock of value). Fair value accounting delivers the value directly from the balance sheet without relying on a required return (as with the mark-to-market investment fund). That is, the forecast of earnings in (B) is not necessary, for book value already reports the value. As a bonus, realisations on value at risk are reported in the income statement to give an indication of what the required return should be.

In short, fair value accounting is a plus, implementation issues aside. However, historical cost accounting has features that provide an alternative should ideal fair value accounting not be attainable. Many of the statements about fair value accounting in the bullet points in the introduction to this paper are misdirected, at least at the conceptual level.

As an illustration of this last statement – and to focus on the practical valuation task – the appendix carries out a valuation of the Coca-Cola Company using historical cost numbers. Coke has a lot of value missing from the balance sheet – its price-to-book ratio is currently 6.3 – mainly because US GAAP does not allow its brand asset to be carried on the balance sheet. Those who complain that accounting is poor because intangible assets are missing from the balance sheet might argue that brands should be booked (as in the UK

⁸ One must accommodate retention that yields additional earnings; the forecast here is for the case of full payout. Valuation under ideal fair value accounting and ideal historical cost accounting is modelled in J. Ohlson and X. Zhang, 'Accrual accounting and equity valuation,' *Journal of Accounting Research*, 36 (Supplement 1998): 85–111.

before IFRS). After reading the Appendix, I hope you will be impressed by how readily Coke can be valued without getting the balance sheet straight. To point (1) above: missing (intangible) assets in the balance sheet are no problem (for valuation) if the earnings from those assets are reported in the income statement. Note that the Coke case is not one where valuation model (D) with ideal historical cost accounting applies. That model implies a forward P/E of 10 (for a 10% required return, say), but Coke's P/E is 19.3. Nor is it a case where the forecast (C) strictly applies. But the imperfections of historical cost accounting can be accommodated.

A core accounting concept underlies the use of historical cost accounting in valuation: the cancelling error property. Provided that earnings are comprehensive (clean-surplus) earnings, it is always true that

$$\text{Stock return}_t = \text{Earnings}_t + (P_t - B_t) - (P_{t-1} - B_{t-1})$$

where P is equity price and B is the book value of equity.⁹ With fair value accounting, $P = B$ at all points in time, so earnings always equal the stock return – just like earnings for the mark-to-market investment fund always equals the market return on the assets (cum-dividend). However, $P = B$ is not necessary; provided that the error in the balance sheet, $P - B$ is the same at the end of the period as at the beginning, capitalising earnings still works. Historical cost reports a balance sheet with error, but the focus is on earnings. We teach the cancelling error property to our first-year accounting students by pointing out that earnings is the same whether one expenses R&D immediately or capitalises it and amortises, provided there is no growth; that is, balance sheet errors cancel. Growth changes this (and therefore growth introduces a change in price premium over book value).

⁹ I believe this equation first appears in P. Easton, T. Harris, and J. Ohlson, 'Accounting earnings can explain most of security returns: the case of long event windows,' *Journal of Accounting and Economics*, 15 (June–September 1992): 119–142, but textbooks of old used to discuss the cancelling error property.

¹⁰ Statement 157 defines the three levels as follows:

Level 1 inputs are quoted prices (unadjusted) observed in active markets for identical assets and liabilities.

Level 2 inputs are inputs other than Level 1 quoted prices that are observable, directly or indirectly; examples include quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs such as observed interest rates, credit risks, volatilities, and default rates, and inputs corroborated by observable market data by correlation or other means.

Level 3 inputs are unobservable inputs for the asset or liability, reflecting the firm's own assumptions about the assumptions that market participants would use in pricing the assets or liability.

But growth can be accommodated in valuation, as the Coca-Cola example shows.

3. Fair value measurements

Concepts are the place to start, but the rubber hits the road with measurement. If ideal fair value accounting can be implemented, all is OK, for nothing is lost by abandoning historical cost accounting, and something is gained; we have a net plus. However, if fair value measurements do not achieve the ideal and at the same time we lose the information provided by historical cost accounting, damage can be done.

After defining fair value as market exit price, the recent FASB Standard 157, *Fair Value Measurements*, then identifies three levels of 'inputs' to determine market price, distinguished by increasing levels of subjectivity.¹⁰ Levels 2 and 3 refer to estimates of hypothetical market prices. The criticisms of subjective measurement are well known, and the FASB's Level 3, in particular, raises concerns. To sort out the pluses and minuses, it is worthwhile to focus on Level 1 measurement – where market prices for identical assets and liabilities are observed in active markets – for, if fair value accounting is not appropriate in that case, concerns are just magnified when subjective estimates are made.

3.1. Pluses and minuses of Level 1 fair value measurements

Implementation of fair value accounting (as proposed by the FASB and IASB) involves two questions. The first is whether exit value measures value to shareholders. The second is whether fair values can be applied at the level of aggregate assets and liabilities that jointly produce value for shareholders – an issue of matching.

Fair value as exit value

One could envision the implementation of ideal fair value accounting with subjective estimates of fair values of assets and liabilities (for shareholders), but that flies in the face of the idea that accounting information should be based on objective, reliable evidence. The FASB and IASB commendably maintain the 'reliability' criterion by requiring that fair value be backed up with an observed market price (at least in their Level 1 implementation). However, equating fair value to market value is quite constraining, for it equates value (to shareholders) to market (exit) price.

Plus: Fair (market) values are a plus when value to the shareholders is determined solely by exposure to market price; that is, shareholder value is one-to-one with market prices.

A marketable bond in which a firm invests its 'excess cash' is exposed to changes in market price that determines the amount of cash on liquidation,

and shareholder welfare is tied to the market price, one-for-one. Accordingly, fair value is appropriate. It is similarly appropriate for shares held in a trading portfolio where the investor gets the return, one-for-one, from the change in market price.

Minus: Fair (market) values are a minus when the firm arbitrages market prices. That is, fair value is not appropriate when the firm adds value (for shareholders) by buying at (input) market prices and selling at (output) market prices.

Raw material used in manufacturing does not get its value from a change in its exit market price, but as an input into a process that adds value to its market price by producing a product and selling it to customers; change in shareholder value is not one-to-one with the change in the market price of the input. With respect to stewardship, the manager should not be rewarded on the basis of changes in the market price of the raw material, but for adding value (earnings) from buying the input favourably and selling it, transformed, to customers with a mark-up.

The one-to-one condition says that fair value is a minus where firms are involved in (expectational) arbitrage (of input and output) prices in their business model; that is, the business model adds value to market prices. Or stated differently, fair value is not appropriate when there is a top-line notion of a customer from whom value is received in an exit price, with value added over an input price. Fair value is appropriate when value comes from property rights and obligations, and value is added or lost (solely) from fluctuations in the market values of those rights and obligations.¹¹

Here are some cases where the one-to-one condition for fair value applies:

1. Investments in securities in a trading portfolio and derivative instruments on such securities.
2. Pension assets: The firm has performed by contributing to the fund and has no influence on the performance of the fund, but shareholder welfare is affected directly by changes in the market value of the fund.
3. Investments by an insurance company. In the business model these securities are value in reserve and that value depends on market price.
4. Real estate held for speculation with no plan for developing or utilising the real estate.
5. Options that give the counter party (but not the

firm) the call rights; the firm is a passive counter party. Warrants and call and put options on the firm's own stock are an example. Freddie Mac and Fannie Mae mortgages are of this type. These are essentially traded put options on real estate – the right of property owners to sell property back to these institutions. Shareholders' welfare is determined by the counter party's call, not the firm's. The market value of the instrument reflects the probability of this call and changes in the market value reflect changes in shareholders' welfare as this probability changes.

Below are some cases where the one-to-one condition for fair value does not apply:

1. Inventory: the firm adds value by finding a customer.
2. Investment in a subsidiary where the firm has influence.
3. Assets and liabilities whose value changes as interest rates change but there is also a numerator effect (on future earnings) as well as a denominator effect from change in interest rates. These typically are instruments that involve customer relationships. Examples: commercial loans, mortgages held by originating banks, and core deposits. Historical cost accounting allows one to observe the numerator effects.
4. Performance obligations. Fair value accounting books the liability to perform at the price that someone else would charge to satisfy the obligation, not at the cost at which the company can perform (possibly with comparative advantage).
5. Receivable allowances and warranty liabilities. Value to shareholders is based on firm performance in servicing these items (through its credit department and customer service department), not what the market would charge for non-recourse relief from the obligation. (Note: market values can be information for disciplining estimates, but as an exercise in improved historical cost accounting, not as an application of fair value accounting.)
6. Insurance assets and liabilities, other than investment assets.
7. Real estate held as input to business enterprise (for example, real estate development, real estate rentals). For real estate rentals, historical cost accounting recognises value through rental income in the income statement.
8. Environmental clean-up liabilities. Fair value is the amount that someone would charge for the clean up, not the anticipated cost to the firm in managing the problem.

¹¹ The perspective is similar to that under Coase's transactions cost theory of the firm. Firms exist because markets are not perfect and thus prices do not measure value under all conditions. Firms and their hierarchies are more efficient than markets in some respect, entrepreneurs exploit those efficiencies, and historical cost accounting reports the efficiency of firms is dealing with imperfect prices.

Fair values are particularly inappropriate when they replace historical cost accounting from which (fair) value is assessed:

Minus: Fair market prices are a minus if they substitute for historical cost information and (efficient) prices depend on historical cost information.

Carrying investments in a subsidiary at market prices (rather than under the equity method or proportionate consolidation) obscures the profitability of the subsidiary and the value of the parent which is based on that profitability. The value of an intermediary function – adding value from the spread between borrowing and lending rates – is obscured by fair valuing loans and borrowings if those exit values do not incorporate the firm-specific ‘intangibles’ in customer and depositor relationships. So with the insurance business that involves customer relationships in managing premiums and losses, along with operating costs.¹²

The loss of historical cost information can lead to inefficient prices. The spectre of inefficient prices raises another issue:

Minus: Fair values bring price bubbles into financial statements.

Fair values (as exit prices) come with a caveat. Provided the one-to-one condition is satisfied, fair values are value to shareholder if market prices are ‘efficient’. In a price bubble, however, inefficient prices are booked on the balance sheet, with bubble gains flowing through to the income statement. For trading portfolios where investments are held short-term, this may not be a large problem. But where the portfolio is held for the long-term, it is a problem. For instance, pension assets marked to bubble prices may give the appearance of satisfactory funding of future pension obligations and insurance assets may give the appearance of adequate or even excess reserves against future insurance losses.

Fair value matching

Fair value accounting is often promoted as a way to avoid the ‘myriad of rules’ involved in implementing revenue and expense matching in the income statement. But fair value accounting has its own matching concept that is difficult to implement.

Minus: Fair value accounting fails without asset and liability matching.

Under a business model, assets and liabilities are used jointly to generate value for shareholders. If so, the stand-alone fair value of an asset has little meaning. To capture value added (from exposure to market prices), one matches fair values of all the assets and liabilities that generate the value together, leaving none out. A particular danger lies in fair valuing an asset and not matching the fair value of an associated liability whose price changes are negatively correlated with those of the asset.

In the income statement, such fair value mismatching results in recognition of gains and not offsetting losses (or vice versa). The case of negative correlation produces ‘excess volatility’ in earnings about which one can indeed complain. Note further that, even if fair values of individual assets and liabilities are matched and summed, the total may not capture the value of the group if they are used synergistically. (In this case it is difficult to see that the one-to-one condition would hold anyway, so the point may be mute.)

Cases where mismatching can occur:

1. Core deposits. These are intangible assets for banks which represent the ability to obtain relatively inexpensive funds from demand, savings and small denomination time deposits. Their value is difficult to estimate but it is negatively related to the value of the loan portfolio: When interest rates rise, the value of the loan portfolio typically declines but the value of the core deposits intangible asset typically increases. If the loan portfolio is marked-to-market but the value of the core deposits intangible is not recognised, earnings and book value will be artificially depressed. But the one-to-one condition says that customer deposits should not be fair valued. So, if loan portfolios are fair valued, a mismatching occurs.
2. Borrowings. The decline in the value of a firm’s assets (due to deteriorating profitability) is accompanied by an offsetting decline in the value of its debt obligations (due to deteriorating credit quality). If the decrease in the value of liabilities is recognised as a gain in the income statement, but the decrease in asset value is not recognised (for example, due to difficulties in measuring the value of some intangible assets such as customer relationships), earnings will be overstated at times when high quality information is especially important.

The matching issue is particularly difficult when an instrument whose value varies with price is used in conjunction with assets and liabilities whose value is tied to customer relationships. A fair value option under IASB standards¹³ (and proposed in a current FASB exposure draft¹⁴), at-

¹² This is not to say that information about the sensitivity of earnings to changes in interest rates (for banks) or embedded values (for insurance companies) are not relevant footnote information.

¹³ The IASB included a fair value option in International Accounting Standard No. 39, *Financial Instruments: Recognition and Measurement* (London: IASB, December 2003). An IASB amendment restricting the fair value option was published in June 2005 under the title, *The Fair Value Option*. The fair value option must be applied to a group of assets and/or liabilities that is both managed, and its performance evaluated, on a fair value basis.

¹⁴ FASB Proposed Statement of Financial Accounting Standards, *The Fair Value Option for Financial Assets and Liabilities* (Norwalk, Conn.: FASB, January 2006).

tempts to address the matching problem, but not so if the asset or liability fair valued under the option does not satisfy the one-to-one condition.

3.2. Pluses and minuses of Level 2 and Level 3 fair value measurements

Levels 2 and 3 admit estimates of hypothetical market prices. Level 3, while insisting that the fair value is based on an estimate of market price (rather than value-in-use), permits 'unobservable inputs' that 'reflect the reporting entity's own assumptions about assumptions that market participants would use in pricing the asset or liability.'

The objections to using subjective estimates are well understood. However, any accounting beyond mere cash accounting involves estimates. The question of where to draw the line on estimates (Level 2 but not Level 3?) is difficult to handle a priori, for resolution rides largely on one's assessment, not only of the integrity of managers but also of their (honest) subjective biases. The competence and independence of monitors – auditors, assessors, and corporate boards – must also be evaluated, along with the effectiveness of controls. (Honest) managers are naturally optimistic, for it is their business plan. Accounting, however, serves as a counterweight to managements' optimism, so raising their estimates to the level of accounting information contaminates. Some argue that such estimates elicit information from management that might not otherwise surface. The stewardship perspective underscores the downside; rewarding managers based on their estimates exposes the shareholder to moral hazard.

Here are a few points to consider when entertaining the use of estimated fair values.

First, the restriction in Section 3.1 that fair value accounting applies only when shareholder value is solely determined by exposure to market prices means that, in most cases, there will be an active market where Level 1 measurements are available. If a firm has to execute by finding a customer in an illiquid market, value is usually determined by that ability to execute, not solely by market prices. So situations where estimation is required may be limited (if the one-to-one condition is honoured).

Second, one must question whether Level 3 really enforces a discipline in estimating market prices. Using one's own assumptions could yield estimates resulting in upfront (day one) estimated profits.

Third, fair value estimation errors introduce error into the balance sheet but also the income statement (which reports the change in fair value). Indeed, with random errors in both the opening

and closing balance sheet – bias aside – the errors are compounded in the income statement.¹⁵ If one has a fuzzy balance sheet, fair value is less informative, but if one also loses the informative historical cost earnings, mark up a definite minus. In the extreme, estimated fair values could produce an uninformative balance sheet and a less uninformative income statement.

Fourth, it is sometimes said that historical cost involves estimates and estimated fair values are no different. But estimates to effect matching under historical cost are based on, and audited against, the historical transaction record – like the historical experience with credit losses, useful lives and warranty service costs. Level 2, with 'observable inputs', could be interpreted as invoking this notion. But the notion is quite different from speculating about the present value of the cash flows when marking to model.

Fifth, historical cost estimates true up against the actual transaction record, and usually fairly quickly. Fair value estimates usually do so but, without an associated 'historical transaction accounting', estimated fair values settle up against estimated fair values. So, the fair value of a long-term contract on the output of an energy plant might be re-estimated each year but, without a reporting on the actual sales and expenses of running the plant each year, the subsequent estimated fair values become elusive. The same can be said about insurance contracts: the fair value of an insurance contract is informed by the historical experience reported in premiums matched to losses and expenses. Note that the FASB's fair value accounting for employee stock options (at grant date) does not settle up at all (so, if the option is not exercised, the recorded expense is not reversed).

Sixth, I suspect that an analyst will have difficulty in carrying out a quality analysis on fair value accounting. How would estimation errors, biased or random, be discovered? Disclosures about the valuation methodology are required under FASB Statement 157 and these presumably will help. But I am not clear on how earnings quality diagnostics of the type applied under historical cost accounting (again, with reference with what is normal in the transaction history) would be developed.

Seventh, observed market behaviour is instructive. Hedge funds (largely unregulated) apply fair value accounting and estimate fair values for illiquid assets. They do so under the rigour of formal valuation committees with oversight of their boards and auditors. But there is a danger in shareholders trading in and out of the fund at values based on estimates. So funds typically limit the percentage of illiquid assets held or require lock-ups or transfers to side pockets until realisation. Private equity funds typically require realisation before distribution. In short, the tolerance for esti-

¹⁵ This effect is demonstrated formally in K. Peasnell, 'Institution-specific Value', BIS Working paper No. 210, August 2006.

mated fair value (by shareholders) is limited.

Eighth, the research reported by Wayne Landsman at this conference indicates that the informativeness of fair values declines as estimates are introduced.

4. Conclusion: pluses and minuses

In this paper I have taken a demand approach in considering the pluses and minuses of fair value accounting: Do fair values enhance the task of equity valuation and stewardship assessment? Surely I have not exhausted this exploration, but some points have been made. At a conceptual level, fair value accounting is a plus; equity value is read from the balance sheet, with no further analysis needed, and the income statement reports realisations for determining value at risk. But concepts are one thing and implementation another. With fair value defined as exit price, the minuses add up (!).

Fair value accounting works well, for both valuation and stewardship, with investment funds (where shareholders trade in and out of the fund at net asset value). This case is instructive for it is the situation where the one-to-one relationship between exit prices and fair value to shareholders holds. That one-to-one condition fails, however, when a firm holds net assets whose value comes from execution of a business plan rather than fluctuations in market prices, even when exit prices are observed in active markets. Asset and liability matching problems confound the problem further. Overlay the minuses of estimated fair values when actual prices are not observed, and the minuses do add up.

I have spent some time laying out the valuation properties of historical cost accounting – better referred to as ‘historical transaction accounting’ –

because I sense that those properties are not always appreciated in the discussion of fair values. A balance sheet focus is not necessary for valuation, for we also have an income statement. Historical cost income statements report earnings from assets and valuation can be made from earnings even though their fair value is not on the balance sheet. The Coca-Cola valuation in the appendix makes the point. I don’t see a plus from booking an estimate of the market price of Coke’s brand asset to the balance sheet and then running the revaluations through the income statement. This scenario is not on the horizon, one would think, but there is little difference in principle in applying exit values to banks’ loans and deposits that also get their value from brands and other customer intangibles.

This having been said, the implementation of historical cost accounting is not without its problems, and many criticisms of historical cost accounting under current GAAP are well taken. The analyst is frustrated by a number of features of GAAP. I really have not engaged in tallying up the pluses and minuses of fair values against the pluses and minuses of historical cost accounting with all its measurement issues. But, it is difficult to see how fair value accounting (with exit prices) solves the problems with historical cost accounting when the one-to-one condition is not satisfied. That condition is a necessary condition for fair value accounting. Further, while the implementation problems with historical cost accounting are due to difficulties of revenue and expense matching, fair value accounting also has its own (asset and liability) matching problems and these appear to be serious ones.

Appendix. A valuation of the Coca-Cola Company based on historical cost information

At the close of trading on 8 December 2006, the Coca-Cola Company's shares traded at \$48.91 each. The price-to-book ratio was 6.3, indicating a lot of value missing from the balance sheet, largely because US GAAP does not allow Coke's intangible (brand) assets to be booked to the balance sheet. The forward P/E was 19.3, based on analysts' consensus EPS forecast for 2007.

The following valuation yields a value of \$49.09 per share using only information available in the historical cost financial statements. The valuation is crude (and can be refined), but the point is that we get close to the market price by using historical cost information and, indeed, with three line items.

The historical cost numbers

Here are the relevant line items for years 2002–2005 (\$m):

	2005	2004	2003	2002
Sales (1)	21,962	21,044	19,656	17,545
Operating income, after tax (2)	5,065	4,427	4,192	3,841
Net operating assets (average) (3)	16,985	16,006	15,220	14,526

The financial statement analysis

From these line items, the following valuation inputs can be calculated:

	2005	2004	2003	2002
Operating profit margin (2 ÷ 1)	23.1%	21.0%	21.3%	21.9%
Asset turnover (1 ÷ 3)	1.29	1.31	1.29	1.21
Average operating profit margin	21.8%			
Average asset turnover	1.28			
Average sales growth rate, on a base of 2001 sales of \$17,354m)	6.6%			

The valuation model

We employ a standard residual income valuation model that calculates missing value in the balance sheet from a forecast of forward (2006) operating income:

$$\text{Value of Equity}_{2005} = \text{Book Value of Equity}_{2005} + \frac{\text{Residual Income from Operations}_{2006}}{\text{Required Return} - \text{Growth Rate}}$$

where

$$\text{Residual Income from Operations}_{2006} = \text{Forecasted Operating Income}_{2006} - (\text{Required Return} \times \text{Net Operating Assets}_{2005})$$

Only the residual income from operations is forecasted because residual earnings from interest on net debt are usually close to zero.

The forecast

As the book value of equity and net operating assets for 2005 are in the 2005 financial statements, we need only a forecast of operating income for 2006, the required return, and the growth rate for residual income.

- For the required return, we will use 10% which is approximately the current Treasury rate of 4.6% plus a risk premium of 5.4%.
- If both the profit margin and the asset turnover are constant, then residual operating income grows at the sales growth rate.¹⁶ The condition is approximately satisfied for Coke, so we set the growth rate at the sales growth rate of 6.6%.
- The historical financial statements supply a forecast of operating income and residual operating income:

$$\begin{aligned} \text{Forecasted sales for 2006} &= \text{Sales for 2005} \times (1 + \text{Average sales growth rate}) \\ &= \$21,962 \times 1.066 \\ &= \$23,411 \end{aligned}$$

$$\begin{aligned} \text{Forecasted operating income for 2006} &= \text{Sales for 2006} \times \text{Average profit margin} \\ &= \$23,411 \times 0.218 \\ &= \$5,104 \end{aligned}$$

$$\begin{aligned} \text{Forecasted residual operating income for 2006} &= \$5,104 - (0.10 \times 17,113) \\ &= \$3,392 \end{aligned}$$

Appendix. A valuation of the Coca-Cola Company based on historical cost information (continued)***The valuation***

With a 2005 book value of equity of \$15,935, the calculated value with these inputs is

$$\begin{aligned} \text{Value of Equity}_{2005} &= \$15,935 + \frac{3,392}{0.10 - 0.066} \\ &= \$115,700\text{m, or } \$49.09 \text{ per share} \end{aligned}$$

The valuation is crude, by design, to make a point. It uses *only* information in the historical financial statements (plus as assumed required return). Yet it comes quite close to the market price of \$48.91. Adding more information (about sales growth rates) and a different required return will change the valuation, but the historical cost financial statements yield considerable insights. Most importantly, it challenges the notion that one needs to have fair values on the balance sheet to value equity claims. Indeed, it is hard to see how fair value estimates of assets and liabilities would enhance the valuation.

In choosing Coca-Cola, I am of course being selective; not all firms are as easy to value as Coke. The historical cost information for a bio-tech start-up with no product yet out of R&D is not much use for valuation, for example. The financial reports would report losses and, possibly, negative book values. However, again, it is difficult to see how exit prices would redeem the accounting. Better for the analyst to get a biochemistry degree.

¹⁶ See S. Penman, *Financial Statement Analysis and Security Valuation*. 3rd ed. (New York: The McGraw-Hill Companies, 2007), p. 523.

Discussion of 'Financial reporting quality: is fair value a plus or a minus?'

Philip Broadley*

I have been asked to give a preparer's perspective as to whether fair value helps or hinders the quality of financial reporting, in response to Stephen Penman's paper. I do so with some trepidation, even more so now that I have actually heard his paper. I would not describe myself as a technical specialist in financial reporting, and I do not often accept invitations to speak on this subject.

When I accepted the invitation, I did not know what Professor Penman was going to say, but now that I have both read the longer paper and had the chance to hear his remarks, I found myself agreeing with it almost entirely, which makes the difficulty of finding anything new to say even harder.

However, as chairman of the Hundred Group of Finance Directors, I have at least a perspective on the views of those who prepare financial statements. Although I speak today in that capacity, I am finance director of an insurance company, and therefore do have some practical experience of grappling with the task of reporting on close to £130bn worth of long-tail liabilities, which provide an opportunity to reflect on some of the philosophical questions of fair value on a regular basis.

It is 20 years this year [2006] since I qualified as a chartered accountant, and in that first flush of youth I contributed to a book (now probably a collector's item) called *Accounting for Treasury Products* by one John Tiner who, some of you based in the UK will know, went on to other things and is currently chief executive of the Financial Services Authority. Fair value then was exciting, and so I was an ardent convert to fair value accounting. Now, as a finance director, I would say I have matured and do not disparage the mixed attribute historic model as something that someone's great grandfather did once; I recognise that it still has some practical relevance.

I would like to speak a little about the preparer's perspective and move on to discuss some of the challenges with fair value approaches. I will give a couple of examples around accounting for pension

liabilities and conclude with some comments about how fair value approaches might help corporate communication or otherwise.

First, let us consider the preparer's perspective. The Hundred Group has recently endorsed a Position Statement that sets out its views on financial reporting (see Appendix). I think it is the first public document setting out the views of leading UK preparers on a vision for financial reporting. Within it we have set out the objectives of financial reporting as, among other things, to provide relevant, reliable, comparable and understandable information to a wide range of users, to assist them in making rational economic decisions, and also to provide a basis for assessment of the results of management's stewardship of the resources entrusted to it. This means reporting what are we actually doing in converting the assets that have been entrusted to us; not the cash or the Treasury bills, but the assets where the business model is doing some sort of conversion.

Within the transaction-based framework of performance reporting, the Hundred Group supports the application of fair value as a basis of measurement where the Level 1 criterion of a reliable market can be derived and where fair value is not searching for a hypothetical value – really where Stephen's one-to-one criterion, as I now know it, is passed.

It is sometimes said that preparers are not themselves users of financial reporting. I have heard that view more than once this year. I disagree; I think preparers – by which I mean companies, their boards and management – take an intense interest in the deliverables that constitute financial reporting. Indeed, one would hope that the financial reporting reflects the way in which businesses are managed and provides a way, as we have described it within our statement, of seeing the business through the eyes of its management, or its board.

It is our view that external reporting, in both its narrative and prescriptive statement form, should provide that insight. We do want to keep the connection between the information that management use day-to-day and the information that is prepared and used in communication with shareholders.

As a finance director, I meet extensively with shareholders and debt-holders and probably hold

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between 150–200 meetings with them annually, depending on the year and the particular circumstances. Over time, I would suggest these meetings do give one some insight into the interests and needs of users. I do not seek to set out to speak for financial statement users; they can and must do so for themselves. My observation is that institutional shareholder interaction with company management involves investors gaining an insight into what we think, challenging that thinking and hopefully becoming comfortable with it. I believe the current transactional model described in the paper serves those discussions well.

Regarding some of the issues of contention: we have heard some of the challenges of definition today, and so I suppose what I am really thinking about here is the mooted paradigm change that Stephen discussed.

It does seem reasonable to me that the measurement of fair value should be predicated on the availability of some sort of observable price. Where I have difficulty is when we move on to the use of internal models because my fear here – evident in my own industry – is that internal models are assumed to have a degree of accuracy and to provide a consistency across reporting companies that may be illusory.

At the Hundred Group, we support the need to simplify accounting standards where possible to reduce cost and complexity for preparers; to increase usefulness and understandability for both internal and external users; and to avoid the problems that can arise due to lack of clarity, comparability and transparency. I suggest it is contentious whether these criteria will be met if market prices are not observable.

The existence of liquid markets is, then, fundamental to the credibility of fair values, and I would question how often deep and liquid markets do exist for many of the transactions reported on, on a fair value basis. Consider pension accounting – it is a fashionable subject to criticise, admittedly, but it is one about which I have some practical experience. In encouraging companies now to provide a buy-out valuation of their pension fund, I would suggest, thinking about a UK context, that if the pension fund has more than about £2bn worth of assets in it, the most sensible and accurate disclosure would be that no buy-out of a scheme of this size has been achieved, and therefore no value is disclosed because that cannot be provided with any degree of certainty. I do not think that is ‘copping out’; rather it is providing an insight as to what management would find if they were to investigate a buy-out valuation.

There is much discussion about the appropriateness of the discount rate used to value pension liabilities: some question the determination of the discount rate and whether it should be made inde-

pendently of the asset mix of the fund. I do not quarrel with that notion.

What I do find more difficult is the idea that in 10 days’ time from now [31 December 2006] several hundred billion pounds’ worth of pension fund liabilities for UK companies will be valued by reference to a relatively small amount of index-linked gilts in issue being traded on a particular day – the bubble notion that Stephen referred to earlier. One only has to look at how rates have moved around periodically to get some sense of that.

In making these comments, I am not denying that there is a problem in recognising pension liabilities, or that that information must be provided to enable investors to make an informed choice. I simply suggest that a single valuation implies a degree of certainty about an outcome that I do not think is helpful; on the contrary, it adds volatility in results as one is attempting to pinpoint precisely a distant outcome.

My analogy to this is that in my spare time I pilot light aircraft around the south of England – so you have been warned, if you live anywhere in that area. If you have ever done any navigation, whether by air or sea, you will probably have learned the 1-in-60 rule: the idea that if your heading is one degree off your true course then after 60 nautical miles you will be one mile away from where you should be. If you can keep within one degree of your true course in a light aircraft, being buffeted around in a strong wind, you are doing very well! On a day of low cloud it is hard work, but the error could result in your straying into controlled airspace and endangering not only yourself but many other people. However, I still think that is easier than plotting the course for pension liabilities over many decades. At least I have come back from my flying, so far.

As to the final question: will fair values provide better market information? Again, I find myself in violent agreement with the ICAEW’s paper. I would also observe that while we have heard where the models could be improved, if fundamentally models that have become comfortable and become a feature of life for a long time are not broken – or not apparently so – then it requires some very thorough cost-benefit analysis to suggest that we need to move to some alternative.

Fair values can provide better information for the markets in cases where observable market prices exist and the tests of depth and liquidity can be passed – and I think meeting the one-to-one test as well, as we heard in the paper. But without that connection to reality, one is in danger of moving into the area where management is voicing opinions rather than providing information. I would suggest it is information that investors are really seeking.

Appendix

Position statement of the Hundred Group on Financial Reporting

27 November 2006

<http://www.100groupfd.co.uk/fdgroup/?t=reports>

1. Objectives of Financial Statements

The Hundred Group supports the following objectives of financial reporting for a business entity:

- to provide relevant, reliable, comparable and understandable information to a wide range of users to assist them to make rational economic decisions about the reporting entity;
- to provide a basis for assessment of the results of the stewardship of the management of the reporting entity of the resources entrusted to it.

2. Conceptual framework for financial reporting

The Hundred Group supports a conceptual framework for financial reporting which is business driven and which ensures financial information reported to investors is closely aligned to the performance information used internally so that existing and potential investors are able to view the business through the eyes of management.

The conceptual framework should encompass information about the financial position, economic and financial performance and changes in financial position of a business.

3. Accounting standards

The Hundred Group supports accounting standards which are principles-based and which are understandable by the non-technical user.

Accounting standards should reflect economic reality and focus on cash flow as the source of value creation. They should not be based on untested theoretical concepts. Accounting standards should not give rise to behaviour which drives business decisions that are not in the economic interests of the business entity.

The Hundred Group supports the need to simplify existing accounting standards:

- to reduce the cost and complexity for preparers;
- to increase the usefulness and understandability for all internal and external users of financial reports; and
- to avoid abuse that might arise due to lack of clarity, comparability and transparency.

4. Convergence

The Hundred Group supports the global convergence of accounting standards:

- to provide a common platform of financial information for existing and potential investors in increasingly global capital markets; and
- to ensure consistency of reporting over time of the business entity and between entities.

5. Performance reporting

The Hundred Group supports the use of a transactional-based framework to report financial performance and to ensure:

- financial performance from operations can be reported separately from value adjustments;
- differentiation of the results of operations from financing activities; and
- proper reconciliation of profits and cash flows.

The principles of realisation and matching are critical for financial performance measurement and reporting.

To properly reflect the measurement of performance and assist users of accounts, recycling of items within the financial statements may be necessary.

6. Basis of measurement

Within the transaction based framework of performance reporting, the Hundred Group supports the use of values in addition to historic cost as a basis of measurement for assets and liabilities in the balance sheet where practicable. The use of such values would be appropriate where there is a reliable basis for assessing value and where the value reflects economic reality. The application of 'fair value' as a basis of measurement is supported only where there is a reliable market from which fair value can be derived and fair value is not a hypothetical value.

7. Narrative reporting and supplemental information

The Hundred Group supports the development of supplementary narrative reporting which is complementary to financial reporting and provides relevant and reliable information about the performance, financial position and prospects of the business enterprise.

The Hundred Group supports the publication of information to supplement financial reporting. Supplementary information might encompass the use of qualitative and quantitative information, financial and non-financial information and projected and historic information to the extent it is considered reliable and relevant to an assessment of the economic performance and prospects of a business as a whole.

8. Forward looking information

The Hundred Group supports the continued development of reporting relating to forward-looking information to the extent it provides reliable information relevant to an understanding of the future prospects of a business. To encourage the development of forward looking information, the Hundred Group supports the use of safe harbour provisions relating to any forward-looking statements.

The SEC rules historical cost accounting: 1934 to the 1970s

Stephen A. Zeff*

Abstract—From its founding in 1934 until 1972 the SEC, and especially its chief accountant, disapproved of most upward revaluations and general price-level restatements of fixed assets as well as depreciation charges based thereon. This article is a historical study of the evolution of the SEC's policy on upward revaluations and restatements of non-financial assets. It treats episodes prior to 1972 when the private-sector bodies that established accounting principles sought to gain a degree of acceptance for such revaluations and restatements but were consistently rebuffed by the SEC. The SEC reversed its policy on upward revaluations during the period from 1972 to the end of the 1970s. Throughout the article, the author endeavours to explain the factors that influenced the successive positions taken by the SEC.

It is well known that the United States has long been a bastion of predominantly historical cost accounting for inventories and fixed assets. Not so well known, however, is the fact that the US insistence on the use of historical cost accounting has emanated from the Securities and Exchange Commission (SEC) and has not always been a tenet held and advocated by leaders of the accountancy profession. It is the aim of this paper to trace the SEC's powerful influence over the predominance of historical cost accounting in the US from its founding in 1934 until the 1970s.

1. Early evolution of the SEC's position on historical cost

The SEC came into existence on 2 July 1934 and was charged with administering the Securities Act of 1933 and the Securities Exchange Act of 1934, the second of which established the SEC.¹ This legislation empowered the SEC to set the rules and regulations to govern the reporting, accounting and disclosure of financial information by companies whose securities were quoted on any national securities exchange, including the contents of prospectuses and periodic filings with the Commission. The SEC created the position of chief accountant in the autumn of 1935, and after

a short search it named Carman G. Blough, a certified public accountant and former academic and Wisconsin government employee who had joined the Commission's registration division in 1934, to the position on 1 December 1935 (Chatov, 1975:103; Cooper, 1980:22). He remained as chief accountant until May 1938, when he left the Commission. From 1944 to 1961, he served as the full-time director of research of the American Institute of Accountants (AIA, Institute).²

The person who effectively cemented the SEC's policy to insist upon historical accounting was Robert E. Healy (pronounced Haley). Prior to becoming one of the five founding SEC commissioners in 1934, Healy had been Chief Counsel of the Federal Trade Commission (FTC) from 1928 to 1934 and directed the FTC's six-year, Congressionally mandated investigation into the market manipulations by public utility holding companies, with heavy emphasis on their use of dubious accounting practices during the 1920s. In the end, the record of the investigation accumulated to 95 volumes.

Healy had been a justice on the Vermont Supreme Court, and President Calvin Coolidge, a Vermonter himself, selected his fellow Republican to direct the FTC's mammoth investigation. Joel Seligman, the SEC's historian, has written, 'The experience radicalised the conservative Healy. Shocked to find that 'you can capitalise in some States practically everything except the furnace ashes in the basement', he became an uncompro-

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¹ The Federal Trade Commission administered the Securities Act of 1933 from June 1933 until 1 September 1934, when this authority was transferred to the SEC.

² For a discussion of the role of the Chief Accountant in relation to the establishment of accounting principles, see the Appendix.

misgiving advocate of accounting and public utility reform' (2003:108).

Healy was livid at the asset value write-ups that public utilities had been booking. It was not only the write-ups themselves, 'however arrived at' (as he said), that incensed him as much as the utilities' follow-on accounting practices. He complained of 'write-ups used to create income or to relieve the income accounts of important charges' (1938:1), which would be debited to the capital surplus account that had been credited with the write-ups. Dividends would sometimes be paid against this unrealised appreciation, and 'Very often unamortised debt discount was charged against a capital surplus so created, thus increasing the reported earnings of the company in future years' (Healy, 1939:4). He was driven to the conclusion that all upward departures from historical cost were veritably heinous. In testimony to a Congressional committee in April 1934, he said, 'I think the proper function of accounting is to make a historical record of events as they happen' (*Stock Exchange Practices*, 1934:7606).³ Later in the 1930s he wrote, 'I think the purpose of accounting is to account – not to present opinions of value' (1938:6).

Remarking on Healy's influence within the SEC, Carman Blough wrote as follows, 30 years later:

'One of the first members of the newly formed SEC to be appointed was a former General Counsel for the Federal Trade Commission who had been in charge of that Commission's very comprehensive investigation of the public utility holding companies. During that study the flagrant write-up policies of the holding companies and their subsidiaries and the havoc they caused when the crash came in 1929 and 1930 kept impressing themselves on the chief investigator to the point that their evil became almost an obsession with him.... So strong were his convictions and so convincing were his arguments against write-ups that all of the other members of the Commission were persuaded to take a positive stand against them from the very first case in which the question arose.' (1967:10).

Homer Kripke, a distinguished legal scholar who was an SEC attorney in 1939–44, has written,

'Healy's strong views dominated the Commission in the 1930s and 1940s when it was still struggling to undo the effects of the indiscriminate departures from [historical] cost in the 1920s. They influenced a whole generation of

SEC accountants, the seniors of whom had served during his incumbency, until the retirement of Andrew Barr as Chief Accountant in 1972. It would be unfair to attribute the SEC's position *solely* to Healy, since the position continued for over a quarter of a century after his death. His position became that of other commissioners and a long succession of staff members because it suited their needs to emphasise objectivity at the expense of other potential attributes of an accounting system.' (1979:182)

Healy served on the SEC from 1934 until his death in November 1946. His record of service as a commissioner was the longest in the SEC's history. Blough's immediate three successors as chief accountant – William W. Wertz (1938–47), Earle C. King (1947–56), and Andrew Barr (1956–72) – all had joined the Commission's accounting staff in the 1930s. Healy and like-minded commissioners succeeded in instilling in them an aversion to upward departures from historical cost if they had not already held that view. In fact, Barr had studied under A. C. Littleton, at the University of Illinois, who was the intellectual leader of the historical cost school.

In a comprehensive study of write-ups, R.G. Walker found that, in the SEC's first several years, its staff discouraged write-ups, and the Commission rejected asset appraisals that were devoid of adequate supporting evidence, not so much because of the revaluation practice *per se* (1992:10–15).⁴ In some cases, notably *Northern States Power Company*, a divided Commission (with Healy in the minority) allowed appraisals if there was sufficient disclosure of the procedure used (Healy, 1938:2–3). Around 1937/38, however, the SEC and its accounting staff began to take a more unequivocal stance against write-ups and by the 1940s were actively banning them. Walker wrote, 'It appears that the SEC had virtually eliminated write-ups from the accounting practices of its registrants by the mid-1940s' (1992:22). By 1970, Kripke would write, 'In effect the SEC has made it an exercise in futility for practicing accountants or anyone else to argue for revision of valuation methods in balance sheets or income statements' (1970:1189).

In 1936, the SEC received some academic support for its historical cost position when the American Accounting Association's executive committee, led by Association President Eric L. Kohler, published 'A tentative statement of accounting principles affecting corporate reports', which strongly endorsed 'original cost' for physical assets. The committee said, 'If values other than unamortised [historical] costs are to be quoted they should be expressed in financial statements only as collateral notations for informative purposes' (1936:189). The committee was explicitly crit-

³ This passage was quoted, slightly amiss, in de Bedts (1964:93).

⁴ Reflecting mainly on the Commission's early years, Barr and Koch (1959:181–2) have written, 'A review of the informal cases involving appraisals shows that the Commission usually effected the elimination of the appraisal'.

ical of revaluations and the use of adjustments for 'ordinary' changes in price levels. It is likely that the Association's executive committee was also recoiling from the indiscriminate asset write-ups in the 1920s.

Not surprisingly, SEC chief accountant Blough said in 1937 that he agreed with the Association's tentative statement (1937:30). Four years later, the Association published an important monograph written by two members of its 1936 executive committee, William A. Paton and A. C. Littleton, which contained an elegant conceptual rationale for the use of historical cost accounting. Yet in their final chapter, entitled 'Interpretation', the authors (chiefly Paton) objectively discussed the pros and cons of replacement cost accounting and 'common dollar' accounting. As to the latter, they said, 'At the most what is needed is a special report supplementing the usual periodic statements and designed to trace the main effects of general price movements upon the affairs of the enterprise' (1940:141), which was a heady proposal at that time. Of the two authors of the monograph, Littleton, at the University of Illinois, was, throughout his career, an arch historical coster. Paton, at the University of Michigan, was a 'value' man.⁵ The historical cost portion of this monograph became a standard text used in university accounting curricula and was widely read by practitioners as well.

2. Developments in the 1940s and 1950s: the SEC's position hardens

2.1. Write-ups

In the context of the SEC's stiffening position on asset write-ups, the US body that established accounting principles (as standard setting was then known), the AIA's part-time Committee on Accounting Procedure, which was composed of 18 practitioners in accountancy firms and three academics, began addressing the question itself. In its *Accounting Research Bulletin (ARB) No. 5*, 'Depreciation on appreciation', issued in April 1940, the committee said, in less than categorical terms, 'Appreciation [on fixed assets] normally should not be reflected on the books of account of corporations' (461). It added, however, that, where such appreciation has been recorded, 'income should be charged with depreciation computed on the new and higher figures' (461). The editor of *The Journal of Accountancy* said that the topic of the *Bulletin* 'has proved to be a particularly thorny subject' ('Two new Research Bulletins',

1940:427). In fact, there were four dissenters. Noteworthy among them was William Paton, who wrote that depreciation on appreciation should not be a determinant of net income 'except in cases where the appraisal is a feature of formal or quasi-reorganization' (467). The *Bulletin* contained only an inconclusive discussion of the pros and cons of allowing asset write-ups by means of a quasi-reorganisation.

The term 'quasi-reorganisation' refers to an accounting procedure by which a company in severe financial straits, with a deficit in retained earnings, could avoid the expensive process of a legal reorganisation by eliminating the deficit and writing down its net asset values to levels that are justified in the light of its economic prospects, as if the company were engaging in a fresh start. Thereby, the company would have the prospect of declaring dividends in future years. Today, we would use the term 'impairment loss' as the rough equivalent of the write-down in the net assets, although the procedure to be used in a quasi-reorganisation is much more elaborate and may require approval by the shareholders (see SEC, 1941; Davis and Largay, 1995).

By the middle of the 1940s, the committee began looking for ways to gain acceptance for upward departures from historical cost. In 1945, the committee unanimously resolved to elaborate on *ARB No. 5*. The committee's proposal, made in the form of a resolution in October 1945, was intended to open the door to the acceptability of an 'upward' quasi-reorganisation when 'supported by convincing evidence and [when] effected with due formality' ('Annual Report', 1946:104).⁶ The argument was made that, since a company could liquidate itself and come into existence afresh by recognising contemporary current costs, whether higher or lower, in its balance sheet, why should it not be possible to establish a new basis of accountability without actually liquidating and relaunching the company? This may have been a tactic to 'blind-side' the SEC, which had accepted a 'downward' quasi-reorganisation. The committee intended to draft an *Accounting Research Bulletin* to reflect this unanimous view. Yet, the following year, the committee reported that it had decided to postpone the preparation of a formal *Bulletin* ('Annual Report', 1947:109). The reason was that SEC chief accountant William Werntz had publicly made known his antipathy to using the quasi-reorganisation to record a write-up of assets (1945:386-7). Instead, the committee was content to write a letter to the AIA's executive committee dated 20 October 1945, saying

'...a new cost may and should be recognised whenever a new basis of corporate accountability is established by reorganisation or quasi-reorganisation if the carrying value of assets on the

⁵ Letter from Paton to the author, dated 24 February 1979.

⁶ An 'upward' quasi-reorganisation might be labelled today as an 'enhancement gain' as the opposite number of an impairment loss.

books has ceased to be representative of their value.⁷ (the letter was reproduced in Research Department, 1950:390)

Five years later, in 1950, the committee returned to the question, following the high post-war inflation. It decided, again unanimously, to draft a *Bulletin* to recommend quasi-reorganisation accounting that would allow write-ups. But the SEC scotched the initiative yet again by advising the committee that it would not accept financial statements with write-ups of the kind envisaged in the proposed *Bulletin*. Hence, the *Bulletin* was never issued (see Zeff, 1972:156–7).

When SEC chief accountants criticised upward departures from historical cost, it was customary that they raised the spectre of the indiscriminate write-up practices of the 1920s, as if it were a nightmare that should not be experienced again.

It was apparently of no moment to the SEC's chief accountant that an 'upward' quasi-reorganisation had won the support of two of the intellectual leaders of the profession. The *doyen* of the accountancy profession, George O. May, a retired partner of Price, Waterhouse & Co. and a member and a former vice-chairman of the committee, had given support to such a procedure in a major book (1943:99). William Paton, who was a member of the committee from 1939 to 1950, had been writing since 1940 that there was an urgent need to allow an 'upward' quasi-reorganisation in order to correct for historical costs that were out of line with current economic realities (see Zeff, 1979:115, 122–6).

Between these two ill-fated attempts to issue a *Bulletin* in favour of 'upward' quasi-reorganisations, which were crushed by explicit opposition from the SEC, the committee faced the question of accounting for the effects of the high postwar inflation on depreciation. In 1947, several major companies, including United States Steel, DuPont, Allied Chemical & Dye, and Sears Roebuck, opted to record depreciation at replacement cost in their financial statements. Industry was concerned that companies with a sizable depreciation charge were significantly overstating their reported earnings. Such earnings reports, companies believed, would be a stimulus for encouraging labour unions, which had been prevent-

ed from pursuing negotiations over wages during the war, to press for significant wage increases and pension benefits. Also, major companies sought a way of defending themselves against public criticisms that they were profiteering at the public's expense (see Smith, 1955:172, 363–5, Appendix B; *Depreciation Policy When Price Levels Change*, 1948). Finally, industry hoped that the use of replacement cost depreciation in their financial statements might persuade Congress to give them comparable relief from being taxed on capital. But SEC chief accountant Earle King, as could be predicted, immediately objected to these upward departures from historical cost (1947a:22), which prompted US Steel instead to adopt accelerated historical cost depreciation on its postwar expenditures for property, plant and equipment, which, as it happens, produced financial results that were not all that different from the use of replacement cost depreciation (see McMullen, 1949; Blough, 1947). King was content with this tactical shift adopted by US Steel (1950:43). Congress, like the SEC, preferred the objectivity of historical cost, and in 1954 it struck a compromise by introducing two new methods of accelerated depreciation on historical cost into the income tax law.

Because of the suddenness of the decision of these major companies in 1947 to adopt replacement cost depreciation in the determination of earnings, the committee had to act quickly to express its view as soon as possible. After the rebuff administered by the SEC two years earlier to the committee's attempt to sanction write-ups under the head of quasi-reorganisations, it is likely that some committee members who favoured the use of replacement cost depreciation would have voted against it because of expected opposition of the SEC. Therefore, it is difficult to know whether all of the committee members were voting their genuinely held views. The committee reacted quickly by publishing a statement in the October 1947 issue of *The Journal of Accountancy* (Committee on Accounting Procedure, 1947). The committee re-issued this statement as *Accounting Research Bulletin No. 33*, entitled 'Depreciation and high costs', dated December 1947. The committee's decision, which was taken with one qualified assent and one abstention,⁸ was that any depreciation in excess of normal historical cost depreciation for the year should be recorded 'below the line', meaning as an appropriation of net income or surplus and not as a deduction in arriving at net income. It said that 'consideration of radical changes in accepted accounting procedure should not be undertaken, at least until a stable price level would make it practicable for business as a whole to make the change at the same time'. Of course, by the time a stable price level were to

⁷ It is not clear what authority such a letter would possess, although it may be assumed that the SEC's accounting staff knew of it. In effect, by sending the letter instead of issuing an *Accounting Research Bulletin*, the Committee was registering its view without 'officially' proposing a practice to be followed.

⁸ The abstaining party was William Paton, who wrote to the author on 6 December 1971 that he left the Committee's meeting room in despair during the discussion prior to taking the vote.

be achieved, the opponents of an upward departure from historical cost depreciation could dismiss the issue as no longer urgent. SEC chief accountant King, who had attended the committee's meeting, publicly lauded the committee's statement (1947b:127–8).⁹

In October 1948, the committee, stung by criticisms made of *ARB No. 33* at the Institute's annual meeting the previous month,¹⁰ reaffirmed its position on replacement cost depreciation in a letter to Institute members (Committee on Accounting Procedure, 1948). But by then the vote attracted four dissenters – the chairman who was the senior technical partner at Peat Marwick (Samuel J. Broad), two well-known partners from middle-sized firms (Maurice E. Peloubet and C. Oliver Wellington, a former chairman of the committee), and an accounting professor (Paton). These four disagreed with the committee's view that 'no basic change in the accounting treatment of depreciation of plant and equipment is practicable or desirable under present [inflationary] conditions' (1948:381). This was the first time in the committee's history that its chairman had registered a dissent. But, as always, the SEC won the day. In the same issue of *The Journal of Accountancy* in which the committee's letter was reproduced, the editor defended the committee's position at length in an editorial ('Institute Committee', 1948).

During the 1940s, the American Accounting Association twice published revisions of its 1936 'principles' statement, in 1941 and 1948 ('Accounting principles', 1941; 'Accounting concepts and standards', 1948). Both reaffirmed the 'cost principle'. As in 1936, they were critical of revaluations, and they said that the country's experience with changing price levels did not warrant making adjustments for such changes. Again, as in 1936, they relegated values other than historical cost to supplementary disclosures. In its 1941 *Annual Report*, the SEC applauded the 1941 revision (SEC, 1942:198; see also Werntz, 1941:315).

⁹ King wrote, '[Assistant Chief Accountant Andrew] Barr and I were present at the meeting at which this release was decided upon and it was strongly advocated by us'. Letter from Earle C. King to The Commission, dated 22 October 1947 (in the author's files).

¹⁰ Prominent among those who criticised *ARB No. 33* during the annual meeting was George O. May, who had been privately counselling U.S. Steel on the wording of the disclosures relating to its replacement cost depreciation charge, with which he agreed. Another critic, who spoke on the floor of the annual meeting, was William Blackie, a CPA, who was vice president of Caterpillar Tractor Co. See Blackie (1948). Interview with Carman Blough, January 1967. See also Papworth (1948:383–4).

¹¹ Chief Accountant King had earlier recommended that the Committee on Accounting Procedure publish a comprehensive statement of accounting principles (1948).

In its 1948 Annual Report, the SEC mentioned the 1948 revision in a favourable light (SEC, 1949:112).

For its part, the SEC took a step in 1950 towards making permanent its requirement that historical cost be used in registrants' financial statements. It announced a general revision of its *Regulation S-X*, which governs the contents of financial reports filed with the Commission and until then had dealt chiefly with matters of disclosure and display. The proposed revision incorporated a number of substantive accounting policy positions that had been dealt with during the 1940s in *Accounting Series Releases*. These included a new provision that said, 'Except as otherwise specifically provided, accounting for all assets shall be based on cost' ('Security [sic] and Exchange Commission', 1950:160). The effect of this new provision would change an ad hoc position of the Commission on the use of historical cost to one that was set in stone. So strong was the negative reaction within the accountancy profession to many of the SEC's proposed changes in *Regulation S-X*, which included a rare expression of opposition from the assembled members at an annual meeting of the American Accounting Association (Zeff, 1966:64–5), that the SEC in 1951 withdrew the provisions dealing with accounting principles in the proposed revision of *Regulation S-X* in return for an assurance that the Committee on Accounting Procedure would, among other things, codify its series of *Bulletins* (Zeff, 1972:158–9).¹¹ Yet the SEC achieved its objective by another means: the revised *Regulation S-X* included a provision that in effect incorporated the *Accounting Series Releases* in the regulation (see Barr, 1979:51).

In 1953, the committee issued *Accounting Research Bulletin No. 43*, which was a restatement and revision of the committee's previous *Bulletins* dealing with accounting principles and procedure. This was the codification sought by the SEC. Chapter 9A of the *Bulletin* was a reaffirmation of *ARB No. 33*, but six of the 20 committee members dissented, which was one vote short of defeating the reaffirmation. The dissenters included senior partners of Peat Marwick and Price Waterhouse, three well-known partners of middle-sized firms, and an academic. The committee felt obliged to state in Ch. 9B of *ARB No. 43* that, in cases where upward revaluations in depreciable assets had been recorded, the subsequent depreciation should be computed on the written-up amounts.

In the late 1940s and into the 1950s, there was disagreement within and among the largest accountancy firms on the propriety of using replacement cost depreciation. Evidently, Peat Marwick was opposed, but senior partners in Price Waterhouse and Arthur Andersen were at odds

within their respective firms on the contentious subject.¹²

From 1954 to 1958, consecutive subcommittees of the Committee on Accounting Procedure laboured to develop a *Bulletin* that would allow the upward revaluation of assets, using the analogy of a quasi-reorganisation. Curiously, these efforts had been encouraged by a suggestion from SEC chairman J. Sinclair Armstrong that it would be helpful to have an authoritative statement of the circumstances in which upward departures from historical cost might be justified (see Armstrong,

1956:159–60). Yet in 1958, by which time Armstrong was no longer on the Commission, the SEC's accounting staff signified to the committee that there was no need for such a general statement. Thereupon, the committee removed the project from its agenda.¹³

2.2. General price-level accounting

Since the late 1940s, interest had been growing in the use of general price-level adjustments applied to historical cost, rather than the use of current cost, to reflect the impact of the increase in prices on financial statements.¹⁴ Perhaps a reason for this different tack, in the minds of some, was the hope that the SEC might view it as less open to objection than the use of current cost. In 1952, the report of the Study Group on Business Income, which was engineered by George O. May, recommended that 'corporations whose ownership is widely distributed should be encouraged to furnish [supplementary] information that will facilitate the determination of income measured in units of approximately equal purchasing power', subject to audit where practicable (1952:105).¹⁵ SEC chief accountant King, who was a member of the broadly constituted Study Group, strongly dissented from this recommendation (1952:122–3). The Study Group's report provided encouragement for the emerging interest, stimulated by the earlier writings of Henry W. Sweeney (1936) and William Paton (1941), in general price-level (GPL)-restated financial information to deal with the recent run-up of inflation.

Beginning in 1953/54, under the aggressive leadership of Leonard Spacek, Arthur Andersen & Co., which had a large client base in the public utility industry, was an outspoken advocate of current cost accounting or, alternatively, the use of GPL indices to restate historical cost depreciation.¹⁶ Indeed, in March 1954 the firm boldly petitioned the SEC to require companies to state in an audited footnote the amount by which net income failed to reflect GPL-restated depreciation of plant and property.¹⁷ In May 1954, the SEC denied the firm's petition, saying as follows:

'The Commission has concluded that [the firm's proposal] is not in accordance with sound and generally accepted accounting principles, that it does not have substantial authoritative support, and that its adoption is not necessary or appropriate in the public interest or for the protection of investors or consumers to carry out the provisions of the statutes administered by the Commission.'¹⁸

A more categorical denial could hardly be imagined.

In the 1950s and 1960s, Spacek's activism led his firm to support the efforts of several of its pub-

¹² Two successive senior technical partners at Peat Marwick, Samuel Broad and John Peoples, dissented from the Committee on Accounting Procedure's letter reaffirming *ARB No. 33* and Chapter 9A in *ARB No. 43*, respectively. In Price, Waterhouse (PW), John B. Inglis, who gave US Steel a qualified report in 1947 because of its use of replacement cost depreciation, voted in favour, but the redoubtable George O. May, by then retired but very much an active thinker and writer, and his protégé in the firm, Paul Grady, together with several other senior PW partners were opposed. In Arthur Andersen, Paul K. Knight, a partner in the firm's New York office and a member of the committee, was in favour, while Leonard Spacek and the partners in the Chicago home office were opposed. The academic who opposed Chapter 9A was C. Aubrey Smith, of the University of Texas, who had spent the summer of 1935 in the SEC's registration division. From outward appearances, the leading partners in Ernst & Ernst, Haskins & Sells, and Lybrand, Ross Bros. & Montgomery were in favour of the position adopted in *ARB No. 33* and in Chapter 9A of *ARB No. 43*.

¹³ Report of the Committee on Accounting Procedure, dated 30 September 1958 (in the author's files). As it happened, the Committee chairman at that time was former SEC Chief Accountant Werntz, by then a partner in a major accountancy firm.

¹⁴ An early indication of this interest was the publication in April 1949 by the AIA's Research Department of a memorandum entitled 'An inquiry into the reliability of index numbers', which was originally intended 'for use as background material for consideration by the committee on accounting procedure in its deliberations as to the feasibility of using index numbers for adjustment of depreciation and/or property carrying values' (Research Department, 1949:312 fn 1).

¹⁵ The Study Group was sponsored by the Institute and was financed jointly by it and the Rockefeller Foundation. It was composed of businessmen, lawyers, economists, statisticians, and others, as well as accountants.

¹⁶ In the UK, GPL accounting became known as Current Purchasing Power (CPP) accounting. GPL accounting was not regarded by theorists as a departure from historical cost accounting but instead as an adaptation of historical cost accounting to inflationary conditions.

¹⁷ The petition was transmitted in a letter to the Commission on 24 March 1954 and was signed by Leonard Spacek on behalf of the firm. Curiously, the SEC, when reporting on the petition in its next *Annual Report*, erroneously referred to the petition as calling for 'economic depreciation (based on replacement at current prices)' (SEC, 1955:107). Perhaps Chief Accountant King did not fully appreciate the difference between GPL-restatements and replacement cost adjustments.

¹⁸ Letter from Orval L. DuBois, Secretary, Securities and Exchange Commission, to Leonard Spacek, dated 28 May 1954. The firm's petition, as well as the letter from DuBois, is in the author's files. The term 'substantial authoritative support' has been used by the SEC since 1938 as the criterion for sound accounting practice. See the SEC's *Accounting Series Release No. 4* (1938), which continues to be in effect today.

lic utility clients to record GPL-restated depreciation or current cost-adjusted depreciation in their financial statements, one client also doing a GPL-restatement of its fixed assets in the balance sheet (see Randall, 1974; Staff of the Accounting Research Division, 1963:194–9, 211–17). The companies' motivation was to show a reduced net income in the light of a larger investment base following the postwar inflation, so that this lower rate of return on assets would support their argument to regulators for higher energy rates to consumers. Yet those of its clients that were SEC registrants were required to relocate the depreciation charge 'below the line' in their filings with the Commission (Zeff, 1992:457–9; Goodrich, 1969). The SEC insisted that a company's reported earnings must reflect depreciation based on conventional historical cost.

Apart from its work with audit clients, Andersen issued a series of publications from 1959 onwards in which it advocated one or another form of price-level depreciation, price-level accounting, and eventually 'value accounting' (*Memorandum on Price-Level Depreciation*, 1959; *Accounting and Reporting Problems of the Accounting Profession*, 1969:5–16; *Objectives of Financial Statements*, 1972).

Also during the 1950s, the American Accounting Association, the organisation of accounting academics, took up the cause of GPL-restated financial reporting. In 1951, an Association committee, which included a leading practitioner (Maurice H. Stans, of Alexander Grant & Company), recommended that companies include comprehensive GPL-restated financial statements as supplementary information to their primary statements ('Price level changes and financial statements', 1951). In 1955–56, the Association published three monographs that explained and illustrated GPL-restated financial statements and argued their merits (Mason, 1955; Jones, 1955; Jones, 1956).

In 1957, the Association committee charged with revising its 'principles' statements turned a corner, departing from the Association's three previous 'principles' statements on whether to provide GPL-restated information. The committee, chaired by Robert K. Mautz of the University of Illinois, recommended that investors *should be* furnished with supplementary data 'to reflect the effect of price changes in the specific assets held by the enterprise during the period, to show the effect upon the enterprise of movements in the general price level, or to achieve both purposes' (Committee on

Accounting Concepts and Standards, 1957:544). After having indicated its positive view on the Association's three previous 'principles' statement, the SEC was conspicuously silent in its *Annual Reports* about whether it endorsed the Association's most recent statement. Chief accountant Barr would write in 1959, begrudgingly, that the SEC 'probably would not object to the inclusion of such [GPL-restated] statements as supplementary material in a filing with the Commission' (Barr and Koch, 1959:182).

During the 1960s, the Accounting Principles Board (APB), which had succeeded the Committee on Accounting Procedure in 1959, became interested in GPL-restatements. In 1963, the APB sponsored the publication of a research study that explained and illustrated GPL-restated financial statements (Staff of the Accounting Research Division, 1963). In an APB research study published in 1965 and written by Paul Grady, a senior partner in Price Waterhouse, he carried forward the views of his late mentor, George O. May, by advocating a supplementary reporting of the financial effects of price-level changes (1965:370).

By the end of the 1960s, the APB added tempered support for GPL-restated financial statements as supplements to the primary statements. In 1969, the APB unanimously approved a non-binding *Statement* to call for the supplementary disclosure of GPL-restated statements. Initially, the subcommittee that began in 1966 to draft the pronouncement understood that the board intended to issue it as a mandatory *Opinion*. Miller and Redding report that the pronouncement became a *Statement* when the board found that it was unable to secure a two-thirds majority for GPL-restatements as a required practice (1986:91).¹⁹ Had the APB issued an *Opinion*, the SEC would not have enforced compliance with it. Indeed, at the board's August 1967 meeting, LeRoy Layton, the chairman of the subcommittee, informed the board that SEC chief accountant Andrew Barr 'was generally not in favour of the positions taken in the draft Opinion principally because of the problems associated with (a) parallel statement presentation, (b) continued restatement of previous financial statements as general price indices change, which he believes would be baffling to readers and might be used as an excuse for 'appraisal accounting' by some persons, and (c) possible legal implications'.²⁰ In the event, few companies adopted the APB's recommendation.

As noted earlier, the periodic intervention of the SEC chief accountant on certain drafts of the Committee on Accounting Procedure and the APB, which occurred also on issues other than the ones that are germane to this article, raises a question whether committee and APB members were voting their genuine beliefs or were bowing to the in-

¹⁹ Sidney Davidson, who was a member of the APB at that time, has confirmed this reason for the change from an *Opinion* to a *Statement*. Telephone conversation with Davidson on 31 December 2006.

²⁰ Accounting Principles Board, Minutes of meeting – 16–18 August 1967, p.10 (in the author's files).

evitable, namely, the position espoused, or known to be held, by the chief accountant.²¹

2.3. Further on upward departures from historical cost

Those who might have hoped at the outset of the 1960s that the newly formed APB could open the door, if only slightly, to upward departures from historical cost accounting were rudely taken aback by the APB's peremptory rejection of its research study on accounting principles, today known as a conceptual framework document, which was published in 1962. The two academic authors of the study, Robert T. Sprouse and Maurice Moonitz, advocated the use of net realisable values or, alternatively, current replacement cost to measure merchandise inventory and the use of current replacement cost to measure plant and equipment (1962:27–34). The research study was received coolly, to say the least, by the members of the APB and by the advisory committee on the project. Indeed, three members of the advisory committee, former SEC chief accountants Blough and Wernitz and the sitting chief accountant, Barr, totally rejected the authors' recommendations.²² Barr minced no words when he wrote, 'indiscriminate application of the [recommended] principles could result in false and misleading financial statements and might tend to undermine the confidence of the public in all published financial statements' (Sprouse and Moonitz, 1962:60). For its part, the APB discarded the research study and declined to consider it again ('Statement', 1962).

In 1963, Arthur R. Wyatt wrote an accounting research study on business combinations for the APB in which, among other things, he recommended a 'fair-value pooling' concept. This meant that, for business combinations effected by an issue of shares and where the constituents were of approximately equal size, the assets of both constituents should be restated at their fair values, up or down (1963:107). He insisted that this approach was 'applicable *only* when the facts of the transaction indicate clearly that the resultant entity is, in effect, a new enterprise' (107). Yet chief

accountant Barr likened Wyatt's 'fair-value pooling' concept for business combinations to the upward quasi-reorganisations to which the SEC had objected some years ago (1965:24). Barr was ever on guard for what he regarded as 'upward' quasi-reorganisations in new guise.

In APB *Opinion No. 6*, issued in 1965, whose purpose was to declare the status of the previously issued *Accounting Research Bulletins* from No. 43 onwards, it was stated that, with respect to Chs. 9A and 9B of *ARB No. 43*, 'property, plant and equipment should not be written up by an entity to reflect appraisal, market or current values which are above cost to the entity' but that 'Whenever appreciation has been recorded on the books, income should be charged with depreciation computed on the written up amounts' (APB, 1965:42). One of the APB members, Sidney Davidson, of the University of Chicago and a former student of Paton's, qualified his assent to the board's view that fixed assets should not be written up to reflect current costs 'but only because he feels current measurement techniques are inadequate for such restatement. When adequate measurement methods are developed, he believes that both the reporting of operations in the income statement and the valuation of plant in the balance sheet would be improved through the use of current rather than acquisition costs' (42).

In 1966, an American Accounting Association committee produced *A Statement of Basic Accounting Theory* (Committee to Prepare a Statement of Basic Accounting Theory, 1966). Among other things, it recommended that both historical and current costs be reported in the body of companies' financial statements (30–1, Appendix B). The author recalls a gathering during the Association's 1966 annual meeting, at which the committee presented its recommendations. During the meeting, SEC chief accountant Barr stated that the SEC would not accept such financial statements.

A possible reason why US companies may not have been greatly concerned over the impact on earnings of historical cost accounting during times of rising prices was the availability of last-in, first-out (LIFO) accounting for inventories as well as the use by a considerable number of companies of one or both of the accelerated methods of depreciation for financial reporting purposes following enactment of the Internal Revenue Code of 1954.

3. Coping with the inflation of the 1970s – the SEC recants on current cost/value

A major changing of the guard within the SEC occurred in 1972. Andrew Barr, the last of the chief accountants who had joined the SEC's accounting staff in the 1930s, retired. Instead of tapping A. Clarence Sampson, Barr's deputy whom he had in-

²¹ In 1972, Charles T. Horngren, an academic and a member of the APB, argued: 'The SEC (top management) has used decentralisation with a master's touch. Its lower-level management (APB) does an enormous amount of work for no salary and has just enough freedom to want to continue the arrangement....the board has been unjustifiably criticised for timidity or vacillation on several occasions when the basic explanation for the Board's behavior has been no assurance of support from the SEC' (1972:39).

²² Blough was then a member of the APB, and Wernitz, a partner in the firm of Lybrand, Ross Bros. & Montgomery, had been the last chairman of the Committee on Accounting Procedure. Barr had been expressly authorised by the Commission to accept the invitation to serve on the advisory committee, which was an unprecedented instance of a chief accountant serving on an Institute committee.

tended to succeed him, SEC chairman William J. Casey decided that he wanted to look outside the Commission for the next chief accountant.²³ He chose an activist, John C. (Sandy) Burton, an accounting and finance professor at Columbia University who had studied accounting at Haverford College with Philip W. Bell. It was Bell, together with Edgar O. Edwards, who wrote a highly influential book in 1961, *The Theory and the Measurement of Business Income*, in which they explained and advocated the use of current cost accounting. Burton was already on record as favouring a change in the traditional accounting model that would better depict economic reality (1971:50). Burton, at age 39, had not been an accountant during the 1930s and thus would not have been haunted, like his predecessors, by tales of the write-ups during the 1920s.

US inflation was high throughout the 1970s, and one of the earliest exposure drafts issued by the newly established Financial Accounting Standards Board (FASB), which succeeded the APB in July 1973, was entitled 'Financial reporting in units of general purchasing power' (1974). Prior to the issue of the exposure draft, the FASB had published a discussion memorandum and held a public hearing on the subject. The recommendation in the draft was that companies' conventional financial statements should include a comprehensive GPL-restatement of their statements. Almost immediately, SEC chief accountant Burton derided the FASB's 'Units of general purchasing power' proposal as 'PuPU accounting' (1975:70). He argued that GPL-restated financial statements would not provide investors with any better information than conventional statements. He observed that 'the impact of inflation falls with dramatic unevenness on various sectors of the economy and various parts of firms'. He added, 'It is essential that rapid movement take place in the direction of replacement cost accounting so that investors can perceive the effects of inflation on the activities of business enterprise' (70). Coming from the SEC, this was indeed a revolutionary call for reform.

Burton meant what he said. In August 1975, the SEC announced a proposed revision to *Regulation S-X* to require that a defined set of large companies make footnote disclosure of replacement cost information for cost of sales, inventories, depreciation, and productive capacity (SEC, 1975; 'SEC proposes', 1975). The proposal, affecting about 1,000 of the country's largest non-financial corporations, went into effect in March 1976, when the

SEC issued *Accounting Series Release (ASR) No. 190*, thereby rebuffing the FASB, which had opted for GPL-restatements (SEC, 1976; 'SEC adopts', 1976). The SEC stated in the release that 'it did not and does not view its [1975] proposal as competitive with that of the FASB', because companies could adopt GPL-restatements in conjunction with historical costs or replacement costs. But Leonard M. Savoie, a former AICPA executive vice-president, wrote, 'I do not know of anyone who agrees with the Commission on that, and the FASB deferred action on its exposure draft' (1979:231). The SEC clearly had taken the initiative for dealing with the effects of inflation out of the FASB's hands.

Although the required replacement cost information was not to be reflected in the body of the financial statements and did not have to be subject to audit, this was nonetheless a historic deviation from the SEC's defence of the primacy of historical cost accounting. Charles Horngren, a close student of the US accounting standard-setting process, attested to the pivotal role played by the chief accountant:

'As chief accountant, John C. Burton persuaded the SEC to mandate fair values...strong influential leaders can make a difference, especially if they are at points of leverage in the process. And timing counts too. For example, as chief accountant of the SEC, Andrew Barr had a well-known aversion to upward departures from historical costs. If Barr were sitting in Burton's chair in 1976, I wonder if the replacement cost requirements would have been issued.' (Horngren, 1986:38)

Under Burton's leadership, the SEC performed a role in the US similar to that played by the Sandilands Committee in the UK in 1975, when the latter suddenly refocused the field of debate from Current Purchasing Power accounting, which had been recommended by the Accounting Standards Steering Committee in a provisional standard, to current cost accounting (see Tweedie and Whittington, 1984, ch. 5).

In 1979, the FASB recovered its lost ground. It issued *Statement of Financial Accounting Standards (SFAS) No. 33* (1979b), which called for the supplementary disclosure of both current cost and GPL-restated data, dubbing the latter as 'constant dollar accounting', which, like the SEC release, applied only to very large corporations. Accordingly, in October 1979, the SEC issued *Accounting Series Release No. 271* to delete the disclosure requirements set out in *ASR No. 190* once the FASB's *SFAS No. 33* were to take effect. Although an FASB standard now governed practice, it had been much influenced by the SEC's powerful intervention.

²³ Interview with A. Clarence Sampson, conducted by Ernest Ten Eyck, 7 July 2005 (SEC Historical Society, at <http://www.sechistorical.org/museum/oralhistories/index.php#smpson>).

Later in the 1970s, the SEC took a further step away from its long embrace of historical cost accounting by calling for the required use of current value information for proven reserves in the body of the financial statements of oil and gas producers.²⁴ The issue arose in the aftermath of the Arab Oil Embargo of the United States and other Western nations in 1973. Congress enacted the Energy Policy and Conservation Act (EPCA) of 1975, which directed the SEC, after receiving formal advice from the FASB, to eliminate the diversity of accounting practice used in oil and gas production. Until then, some producers would capitalise only the costs incurred in successful production, while expensing the costs associated with failed attempts at discovering oil or gas deposits. This method, used mainly by the large, vertically integrated oil and gas companies, is known as 'successful efforts costing'. Other producers would capitalise all of the costs associated with oil and gas exploration. This method, used mainly by the smaller companies, is known as 'full costing'.

In 1977, the FASB issued *SFAS No. 19*, which, by a 4-3 vote, recommended that only the 'successful efforts costing' method be permitted. In reaching its conclusion, the board was under considerable pressure from small and medium-sized oil and gas companies not to require the use of 'successful efforts costing' (Staubus, 2003: 185-6; Van Riper, 1994, ch.4). As required by the EPCA, the SEC held public hearings, covering 12 days and accumulating 2,700 pages of transcript, with all five members of the Commission in attendance. Furthermore, there was intense pressure brought on the SEC from the smaller oil and gas companies, much of which was transmitted through members of Congress and federal departments, such as Justice and Energy. They used all of their lobbying might to defend against the imposition of 'successful efforts costing', which, they believed, would make their earnings trend much more volatile. For one of the few times in the SEC's history, all of the commissioners – who rarely are versed in accounting – personally became immersed in an accounting issue.²⁵ Not being schooled in accounting, the commissioners had no allegiance to historical cost accounting, and they believed that, for the oil and gas industry, it was market values, not historical costs, that were relevant to investors. Indeed, this view was pressed on them numerous times during the hearings. It helped that the chairman, Harold M. Williams, al-

though trained as a lawyer, had been formerly a business school dean and a board director of a major oil and gas company. The commissioners also believed, as did their accounting staff, that neither 'successful efforts costing' nor 'full costing' was demonstrably superior to the other. Accordingly, in August 1978, the SEC issued *Accounting Series Release No. 253*, which said that steps should be taken to develop and implement 'reserve recognition accounting' (RRA), a variant of current value accounting, for required use in the body of oil and gas companies' financial statements. Under RRA, the unrealised holding gains and losses in value of proven oil and gas reserves were to be taken to earnings. For the first time since the founding of the SEC in 1934, the Commission required a class of registrants to depart from historical cost accounting in the body of their financial statements. Times had indeed changed, and by then the memories of the flagrant write-ups of the 1920s had faded.

The SEC said that, in the interim, until RRA is ready for implementation, oil and gas companies may continue using either 'successful efforts costing' or 'full costing'. Thereupon, the FASB felt it had no option but to issue *SFAS No. 25* to suspend the effective date for the requirement in *SFAS No. 19* to use 'successful efforts costing' (1979a).

Following the issue of the SEC's release, the major oil and gas companies began to bring pressure on the SEC not to require the use of current values for their proven oil and gas reserves because of its impact on the public's perception of their profitability at a time of steadily rising petrol prices and constricted supply. The Organisation of the Petroleum Exporting Countries (OPEC) was raising the price of crude each quarter, and the major refining and marketing companies were already being denounced in the media for their escalating profits. In the end, in February 1981, the SEC reconsidered its requirement that RRA be used in the body of producers' financial statements and instead announced its support of a move by the FASB to develop a comprehensive footnote disclosure that would reflect the principles implicit in RRA. The FASB issued that guidance in *SFAS No. 69*, issued in November 1982.

But the precedent had been set. In 1978, for the first time, the SEC had announced as a matter of policy that historical cost accounting was not always to be preferred over the use of current values in the body of companies' financial statements.

4. Conclusion

One can see from the foregoing analysis that the SEC established and restated its position time and again on the primacy of conventional historical cost accounting during its first 38 years (that is, until 1972), even when the Committee

²⁴ For a full and authoritative treatment of this oil and gas accounting episode, see Gorton (1991).

²⁵ An earlier such hearing was on 22 November 1965, when the Commissioners met with a delegation from the APB to discuss the classification of the deferred tax credit, which led to the issue of *Accounting Series Release No. 102* (SEC, 1965). For a discussion of this episode, see Zeff (2007).

on Accounting Procedure or the Accounting Principles Board was disposed to approve upward adjustments in one manner or another from conventional historical cost. This posture of the SEC explains the deeply held attachment to historical cost accounting that one associates with US financial reporting during much of the 20th century. The year 1972 marked the arrival of a chief accountant who was unencumbered by memories of the indiscriminate write-ups of the 1920s and, moreover, had been tutored in the merits of current cost accounting. Owing to his proactive influence, the SEC approved the required use by more than one thousand large companies of supplementary replacement cost disclosures during the inflationary 1970s. The SEC took one major step further

when, during an intense period of controversy over accounting for oil and gas exploration in the second half of the 1970s, it called for the integration of current values into the body of companies' financial statements as a better solution than arbitrating the supremacy of 'full cost costing' in relation to 'successful efforts costing'. In the 1970s, the SEC had entered a new era in the regulation of company financial reporting.

The record of the SEC's numerous and powerful intrusions into the process of establishing proper accounting practice for inventories and fixed assets does much to call into question whether the United States truly has had a private-sector process for establishing 'generally accepted accounting principles'.

Appendix

The role of the SEC chief accountant in relation to the bodies that establish accounting principles

The chief accountant is the principal adviser to the Commission on accounting and auditing matters. From 1937 to 1982, the Commission issued *Accounting Series Releases* to express its view on accounting and auditing matters and to report on enforcement actions taken by the Commission. The Office of the Chief Accountant, together with the Division of Corporation Finance, which oversees corporate disclosure of important information to the investing public, have, since 1975, issued *Staff Accounting Bulletins* to convey their interpretations and practices in administering the disclosure requirements of the federal securities acts.

While the SEC has stated that it looks to the private sector for leadership in the establishment of accounting principles, all parties know that the ultimate authority to establish those principles rests with the SEC, which, in most instances, usually means the Office of the Chief Accountant.

The American Institute of Accountants, at the urging of the chief accountant (Blough, 1967: 5–7), enlarged its Committee on Accounting Procedure in 1938–39 and invested it with authority to issue *Accounting Research Bulletins* (ARBs), setting out its opinion on proper accounting practice, which came to be known as 'generally accepted accounting principles' (GAAP). Unless the chief accountant were to make known his disagreement with an ARB or with the authoritative pronouncements of its successor bodies, it may be assumed that the SEC expects all publicly traded companies, known as registrants, to comply with them. As is made evident in this article, the chief accountant occasionally attended meetings of the committee, and he and his staff communicated on a regular basis, in writing and orally, with members of the committee and its research staff.

The Accounting Principles Board (APB), which succeeded the Committee on Accounting Procedure in 1959, was a senior technical committee of the American Institute of Certified Public Accountants, which adopted its new name in 1957. Its authoritative recommendations on GAAP were called *Opinions*. In addition, it issued several *Statements* that constituted non-binding advice. The SEC chief accountant and his staff maintained frequent contact with the APB and its staff but did not attend its meetings.

The Financial Accounting Standards Board (FASB), an independent standard-setting body overseen by a board of trustees, succeeded the APB in 1973. Its authoritative recommendations on GAAP are known as *Statements of Financial Accounting Standards*. As with the FASB's two predecessors, the SEC chief accountant and his staff have been in regular contact with the FASB and its staff. Some or all of the SEC commissioners meet periodically with some or all of the FASB members, together with their respective staffs, and the chief accountant participates in meetings of the FASB's Emerging Issues Task Force and attends and speaks at the quarterly meetings of the FASB's advisory council.

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How does changing measurement change management behaviour? A review of the evidence

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Abstract—The effect of a change in accounting standards on reporting firms' economic behaviour is often a concern raised by those opposing the accounting change. Some view these changes in behaviour as an inevitable consequence of a rule change. Others are not persuaded by these arguments. Although the empirical evidence of changes in economic behaviour is not extensive, it is consistent with accounting changes resulting in firms changing both operating and financing decisions. The evidence of which economic incentives give rise to these changes is more limited. Changes in economic behaviour appear consistently to be related to the regulatory use of accounting numbers. In addition, some evidence related to incentives created by management compensation and by market discipline has been found. Evidence of the importance of debt covenants in inducing accounting changes is less convincing given limited examination of actual debt contracts and the use of poor proxies of covenant slack. The existing research does little to tell us whether any changes in behaviour are for the better or for the worse.

1. Introduction

Critics of changes in accounting standards often argue against the changes because they will result in changes concerning reporting firms' economic behaviour. A recent example of these arguments occurred during a Congressional Hearing of the Committee on Financial Services (US House of Representatives, 2004). In that hearing, US Representative Royce argued that economic behaviour had already changed as a result of the employee stock option expensing proposal of the Financial Accounting Standards Board (FASB). Opponents of expensing options argued it would impede job creation and slow economic growth. Similar concerns have been expressed about many other proposed accounting changes. Although this type of argument is frequently made, the rationale is not often given or defended, and implicit in the criticism is the assumption that changes in behaviour are undesirable.

For some, the idea that accounting changes would lead to changes in behaviour seems obvious. Consistent with this view Sandy Burton, former Securities and Exchange Commission (SEC) chief accountant, is quoted in Forbes (1977) as saying '...there is no doubt that measurement standards have an impact on behaviour. That impact cannot be ignored in setting measurement standards. There's a delicate balance you have to have.' This statement implies that the notion that

standard-setters should care about these changes in behaviour is equally obvious.

For others the idea that accounting change would lead to changes in behaviour is not believable. Beresford (1998), former FASB chairman, states that 'most of these kinds of allegations about so called "economic consequences" are pretty difficult, if not impossible, to prove and even members of Congress usually are not persuaded by them in the final analysis.' His statement suggests that these arguments merely reflect political posturing.

Even those who believe that changes in behaviour occur do not necessarily agree about whether the change is for better or worse. For example, some suggest that the Statement of Financial Accounting Standards SFAS 106, requiring accrual of post-employment benefits, provided a 'wake-up call' about the magnitude of the costs associated with retiree benefits. This view is expressed by Ben Neuhausen, a partner in Arthur Andersen's professional standards group, who was quoted by Singh (2001) as saying, 'I think some companies were genuinely clueless about how much these benefits were going to cost them over the long haul ... once Statement 106 forced them to measure these obligations, a lot of companies realised that they had offered benefits they could not afford.' In contrast, Reuters (1990) reported that when commenting to the SEC on fair value accounting for investment securities Federal Reserve chairman Alan Greenspan states that 'the adoption of market-value accounting for the investment securities portfolio might also affect the amount of securities that banks are willing to hold. Many

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institutions would likely reduce their holdings of marketable instruments, thereby having the undesired effect of reducing the liquidity of banking organisations.'

Furthermore, some standard setters hold the view that whether or not behavioural changes occur and whether those changes are good or bad is irrelevant for setting standards. For example, Leisenring (1990), former vice-chairman of the FASB states that 'Unfortunately, it is once again fashionable to suggest that the FASB should abandon the notion that decision-useful information must be neutral and should consider the "economic consequences" of its decisions. Some would even assert that the FASB should try to determine in advance who will be relatively helped or hurt by the result of applying a particular accounting standard, and consider "public policy implications" when it establishes accounting standards. In a word, bias the information reported to influence the capital allocation or other economic decisions toward some predetermined objective, thereby undermining the proper functioning of the capital markets and impairing investors' and creditors' capital allocation decisions.'

These views suggest that the issue of whether accounting standard setters should consider resulting changes in economic behaviour when writing accounting standards is controversial. For some, changes in management behaviour seems like an obvious consequence of accounting change, while for others the claims of behavioural changes seem difficult, if not impossible to prove. Furthermore, some argue that firms are better off as a result of these changes while others argue that firms are damaged by the changes. Finally, some believe that regardless of the desirability of the changes in behaviour they should not be considered when setting standards.

The level of controversy about changes in management behaviour has not been matched by the amount of research in this area. Generally, there has been little published academic research in accounting that has examined whether firms actually change their economic behaviour in response to accounting changes. Less than 10% of the studies focusing on FASB accounting standards published in the top three US academic accounting journals (i.e. *Accounting Review*, *Journal of Accounting and Economics* and *Journal of Accounting Research*) directly examines the effects that these accounting standards have on firms' economic behaviour. A majority of the studies consider valuation issues and roughly a quarter of the studies examine accounting choices firms make when adopting the standard. The explanation as to why there is so little emphasis on this seemingly important research question is not obvious. One possibility is that this research has been undertaken

but that accounting changes do not actually lead to changes in economic behaviour. A bias against publishing null results may have led to few of these studies appearing in these journals. A second possibility is that the difficulty in documenting these changes in behaviour convincingly may be too discouraging. Another possibility is that this research is not well received because those who believe that firms' economic behaviour responds to accounting changes find the results obvious, while those that do not believe that firms would respond to accounting changes do not believe the results.

Despite the relative lack of emphasis on examining whether changes in accounting standards result in changes in economic behaviour, there has been some research published over the past 25 years documenting this phenomenon. This research can help to answer the questions of whether the changes occur. Although these studies often discuss the incentives for these changes in behaviour, few of the studies conduct tests of which economic incentives gave rise to the documented changes. To some extent this research can help answer the question of why these changes occur. The research does little to tell us whether the changes are for the better or for the worse, or to inform standard-setters about whether they should address these potential changes in behaviour.

The next section reports the existing evidence documenting changes in firms operating and financing activities following several important accounting changes that have been implemented over the past three decades. The following section discusses potential economic incentives that would lead firms to change their behaviour as a result of a change in accounting rules. The final section provides suggestions for further research and conclusions.

2. Measurement changes

During the past three decades, there have been many important accounting changes that potentially might have led firms to change their economic behaviour. Such changes could relate either to operating activities or to financing decisions. Research studies have been conducted for several of these changes to determine whether evidence of their effect in economic behaviour can be found.

Conducting this type of research is challenging. Evidence based on surveys such as the one conducted by Goodacre et al. (2006), is not likely to persuade sceptics who view statements about behavioural changes as political posturing because survey responses may not be consistent with actions actually taken. Documenting a stock market reaction is not sufficient to conclude that a behavioural change has occurred, since the market reaction will not be limited to these behavioural

changes. This suggests that convincing evidence of a behavioural change requires documenting that economic behaviour is different after the accounting change than it was before. However, economic behaviour will be affected by factors other than the accounting change. Convincingly isolating the effect of the accounting change will require either a well-specified model of the economic behaviour or an appropriate control sample. Since firms cannot be randomly assigned to be control firms, the use of a control sample will typically require a correction for self-selection.

2.1. Measurement changes that affect operating activities

2.1.1. Mandated expensing of research and development (R&D)

Several studies of changes in economic behaviour have focused on SFAS 2, which requires the expensing of research and development expenditures. This issue has undoubtedly attracted attention for a variety of reasons. In part the focus on the change in accounting for R&D reflects the importance of these expenditures to economic growth and productivity. The mixed results found in the original studies of this accounting change have most likely also resulted in additional research on this issue.

Horowitz and Kolodny (1981) document a reduction in R&D spending at the time of adoption of SFAS No. 2 for a sample of over-the-counter (OTC) traded firms that were forced to change from capitalising to expensing R&D expenditures relative to a matched control sample of firms that expensed R&D prior to SFAS 2. They discuss several possible explanations for the documented change in behaviour. First, they mention the possibility that the market for the small firms examined may not be efficient. Second, they note that, regardless of whether the market is efficient, if managers believe that the market is inefficient then accounting changes may result in changes in behaviour. The third and fourth possibilities mentioned are that management compensation plans or contractual lending constraints might induce a change in behaviour. Finally, it is noted that stock exchange listing requirements or government contract evaluation procedures might result in a change in economic behaviour. Although they discuss these possibilities, they do not explicitly test for why these changes occurred.

Dukes et al. (1980) also examine the behavioural changes in R&D expenditures following the issuance of SFAS 2. They fail to find support for an effect on research and development expenditures attributable to SFAS 2 for a sample of New York Stock Exchange (NYSE) and American Stock Exchange (AMEX) firms. They acknowledge that their lack of findings may be attributable to their

focus on large firms.

Elliott et al. (1984) attempt to reconcile the inconsistent results found in Horowitz and Kolodny (1981) versus in Dukes et al. (1980). Using the Horowitz and Kolodny method of measuring changes in R&D expenditures, they find a change in behaviour for both listed firms and OTC firms. Using the Dukes et al. (1980) method, they find a change in behaviour for the OTC firms but not for the listed firms. They argue that the matched-pair design used in both studies may not be appropriate because it does not control for self-selection problems caused by comparing firms that choose to capitalise against those that chose to expense R&D prior to the accounting rule change.

Sheheta (1991) examines the issue of self-selection bias in the analysis of the economic consequences of the mandatory change in accounting for R&D. He finds a more negative change in R&D expenditures for firms that previously capitalised relative to firms that previously expensed R&D after controlling for the self-selection bias. These results confirm a change in economic behaviour associated with the change in accounting for R&D, but do not consider the economic incentives that gave rise to these changes.

While none of these studies examine whether R&D expenditures were optimal prior to the accounting change, the implicit assumption underlying these studies is that the accounting change had an undesirable effect on R&D expenditures by the expenditures declined after the accounting change.

2.1.2. Accrual of Other Post Employment Benefits (OPEB) liabilities

Another important accounting change with the potential to affect firms' operating decision is the requirement that other post retirement benefits (OPEBs) be accounted for on an accrual rather than cash basis. This accounting change resulted in approximately \$300 bn in unfunded benefits liabilities added to the balance sheet of US public firms. This large increase in firms' leverage may have provided incentives to reduce benefits to mitigate the financial statement effect of this accounting change.

Mittelstaedt et al. (1995) document the prevalence, magnitude and timing of retiree health care benefit reductions associated with the adoption of SFAS 106 and examine the determinants of the benefit-reduction decisions. Unlike the SFAS 2 studies they do not have a control sample of firms that engage in the transaction being studied, and which were unaffected by the accounting change. Instead they attempt to control for factors other than SFAS 106 that might lead to changes in post-retirement benefits. They claim that their results indicate that firms cutting benefits are financially weaker and have higher retiree health care costs at

the time benefits are reduced. They conclude that SFAS No. 106 cannot be viewed as the sole cause of the health care benefit reductions.

To the extent that the benefit reductions occurred in firms that were financially weak and had higher retiree health care costs, the results of this study are not inconsistent with arguments made that SFAS 106 helped firms realise that they had offered benefits which they could not afford.

2.1.3. Fair valuing investment securities

For financial institutions the change to fair value accounting for investment securities was an important accounting change with the potential to affect their operating decisions. The use of fair value accounting for only a single type of asset while ignoring concurrent changes in the values of other assets and liabilities could lead to unrealistic volatility in reported equity, and therefore provide an incentive to change investment behaviour.

Beatty (1995) compares changes in the investment behaviour of bank holding companies that early adopted SFAS 115 versus those that did not in the SFAS 115 early adoption quarter. Her analysis includes a self-selection correction for the early adoption decision. She finds a decrease in both the proportion of assets held in investment securities and the maturity of the investment securities held. These changes are related to the banks regulatory capital ratio, suggesting that the volatility in recognised fair values may have led banks to change investment behaviour due to regulatory capital costs that could have arisen from the accounting change. She concludes that shortening the maturity of the investment portfolio may reduce interest income earned or increase their interest rate risk. Increased exposure to interest rate changes could make the banking industry more volatile, which was one of the arguments raised by Greenspan when opposing this standard.

2.1.4. Fair valuing derivatives

Increased volatility in earnings for derivatives not qualifying for hedge accounting treatment may alter use of derivatives. Zhang (2006) examines whether the FASB's standard on accounting for derivative instruments (SFAS 133) caused a change in corporate risk-management behaviour. She hypothesises that the effect of the standard on firms' risk-management activities varies depending on the hedging effectiveness of the derivative instruments. She finds that after the adoption of SFAS 133 interest-rate risk, foreign exchange-rate risk, and commodity price risk decreases for firms that were speculators relative to firms who were hedgers. Zhang concludes that SFAS 133 discouraged firms' speculative use of derivative instruments. She does not consider reasons that firms are concerned with earnings volatility. To the extent

that standard setters are interested in how accounting changes affect managements' behaviour, her evidence of a decrease in the speculative use of derivatives suggests a potentially beneficial change in behaviour.

2.2. Measurement changes that affect financing decisions

Lease financing is a commonly used vehicle for financing long-term assets. An important accounting change that had the potential to affect how firms finance their operations was the requirement by SFAS 13 that capital leases be recognised as assets and liabilities on the balance sheet. Increases in reported debt associated with capitalising leases may result in firms structuring leases to obtain operating lease treatment.

Imhoff and Thomas (1988) document a significant change in the structure of leases in response to SFAS 13 for a sample of firms that disclosed a high amount of capital leases prior to the accounting change relative to a sample of firms that reported a low amount of capital leases prior to the accounting change. They find a corresponding increase in the amount of operating leases used by these firms, which suggests a substitution from capital leases to operating leases. However, they find that total leases declined after the accounting change. They also find that the high-lease group has greater increases in equity financing and larger decreases in debt financing after the accounting change. They do not consider reasons for these financing changes.

Beattie et al. (1998) document that key accounting ratios would be affected by the change in lease accounting required by FRS 5 for a random sample of 300 listed UK companies. While they suggest that because these ratios are employed in decision-making and in financial contracts the changes may affect managers' behaviour, they do not examine whether these behaviour changes occurred.

Altamuro (2006) reports similar findings in her examination of whether firms decrease their use of synthetic leases after FASB Interpretation No. 46 (FIN 46) required that they be reported on the balance sheet. Prior to this change in accounting rule, companies acquired assets using this type of financing structure so that for financial accounting purposes the asset and the corresponding depreciation of the asset were recorded on the books of the special purpose entity rather than on their own. This off-balance sheet financing treatment was curtailed by FIN 46's requirement that their primary beneficiary consolidate these variable interest entities. She reports a decline in synthetic lease usage relative to mortgage financing after FIN 46 was adopted. She also does not examine the reasons for the change in behaviour. To the extent that

the objective of the change in accounting was to reduce the use of off-balance sheet financing vehicles, Altamuro's results suggest that the standard may have produced the desired outcome.

2.3. Summary of studies documenting behaviour changes

Research on six important accounting changes has documented evidence consistent with changes in operating and financing activities following the accounting changes. For five of the six changes examined the findings were relative to a control sample of firms unaffected by the accounting change. In two studies where a self-selection correction was included the correction resulted in a larger effect rather than a smaller one. The primary focus of these papers has been on the existence of a change rather than on the reason for the change. The results in these papers suggest that these changes in behaviour may be beneficial in some circumstances but undesirable in others.

3. Potential economic motives for changes in behaviour

In their *'Conceptual Framework for Financial Reporting: Objective of Financial Reporting and Qualitative Characteristics of Decision – Useful Financial Reporting Information'*, the FASB and IASB acknowledge that the information provided by general purpose external financial reporting is directed to the needs of a wide range of users rather than only to the needs of a single group. The potential users of financial reports that they discuss include creditors, equity investors, governments, regulators, employees, suppliers, creditors, and the public. The existence of many different financial statement users suggests that accounting changes could lead to changes in firms' economic behaviours for a variety of reasons.

The research examining potential reasons for behaviour changes has considered a variety of incentives including debt and compensation contracts, capital and rate regulation and market incentives. This research also faces several challenges. Examining the contracting incentive can be difficult because contract terms are not always readily available. Constructing measures correlated with the unobservable contract terms has proven to be difficult. Since regulators may use either generally accepted or regulatory accounting principles, whether regulatory incentives exist is determined on a case specific basis. The explanation for why the market would care about a reporting change can be difficult to articulate and to measure.

3.1. Contracting role of accounting

Watts and Zimmerman (1986) state that 'accounting plays an important role both in contract terms and in monitoring those terms'. They further

argue that 'there is an important cash flow and value linkage introduced by accounting's contracting role'. Similar views are expressed in Standard & Poor's (S&P 2006), which states that S&P, as part of its surveillance process, monitors the potential impact of changes in accounting standards. S&P (2006) states that it 'is possible accounting changes could trigger financial covenant violations or regulatory or tax consequences, and could even influence changes in business behaviour, such as a change in hedging policy'.

The FASB and IASB provide a contrasting view of the role of contracting in financial reporting. FASB (2006) states that 'because general purpose financial reports are prepared in accordance with a generally accepted set of financial reporting standards and often are audited, the parties to an agreement may consider them useful as the basis for contractual agreements. However, the parties to an agreement are generally able to specify how financial reporting standards are applied for the purpose of that agreement, including which information in a financial report is used and how it is used. For example, a restrictive covenant may be stated in terms of a particular line item or subtotal on a financial statement, prepared in accordance with financial reporting standards in effect at a specified date. Therefore, reports prepared solely as the basis for contractual agreements are specialised reports, rather than general purpose financial reports that are the subject of this draft framework.'

Research examining the extent to which contracts rely on GAAP accounting numbers as of the reporting date should help distinguish between these two opposing views.

3.1.1. Debt contracting

One of the most commonly discussed rationales for why accounting changes might lead to changes in firms economic behaviour relates to the use of accounting numbers in debt contracts. These arguments assume that debt contracts contain financial covenants and that the covenant calculations are based on GAAP in force at the time of the calculation rather than in effect at the time that the firm enters into the contract. Several papers indicate that this may not always or even frequently be the case. Begley and Freedman (2004) document that the use of financial covenants in public debt contracts has changed through time. Specifically, they note a dramatic decline in the use of accounting numbers over the last three decades. Accounting-based covenants restricting dividends and additional borrowing appear in less than 10% of the most recent sample of debt contracts examined. They conclude that recently executed public covenants provide little incentive for managers to manipulate accounting numbers. The implications for a likely change in economic behaviour induced

by a change in accounting are similar. Begley and Freedman (2004) also re-examine the correlation between a firm's leverage ratio and use of covenants. They find that the rank correlation dropped from nearly 60% during the 1970s to below 5% in the late 1990s. They conclude that the leverage ratio is no longer a good indicator of the use of financial covenants in public debt.

In contrast to public debt, private debt continues to extensively use financial covenants. However, there is substantial evidence that those covenants commonly are not affected by changes in GAAP. An early paper (Leftwich, 1993) considers the use of non-GAAP numbers in covenant calculations. He examines recommended covenant definitions in Commentaries, which is a reference manual for lawyers who negotiate restrictive covenants in lending agreements. In addition, Leftwich examines 10 private lending agreements to verify that the definitions contained in Commentaries appear in actual lending agreements. He finds that the definitions used in covenant calculations use GAAP as a starting point, but make modifications to the GAAP numbers. The modifications disallow certain increases to income and assets that are required by GAAP but insist on certain decreases in income and assets that are not required by GAAP. During the period that he examined, he found that covenants were based on GAAP numbers in force at the time of the covenant calculation rather than GAAP at the time that the contract was signed.

More recent evidence on covenant calculations in private lending agreements suggests that the use of GAAP at the time of covenant calculation has also changed. Mohrman (1996) examines a sample of 228 lending contracts entered into between 1963/1990 including 148 bank loans, 41 public debt issues and 39 private placements. She finds that roughly 25% of the contracts do not include accounting-based covenants. The remaining 75% with accounting-based covenants are split roughly equally into those with covenant calculations affected by accounting changes and those that are unaffected by accounting changes.

Further evidence on how accounting changes affect covenant calculations is provided by Beatty et al. (2002). They examine how the interest rate charged for a sample of 206 bank loans enter into between 1994 and 1996 is affected by the exclusion of either voluntary or mandatory accounting changes from the calculation of covenant compliance. They find that nearly 75% of the loans exclude the effect of mandatory accounting changes from covenant calculations, while roughly 50% exclude the effects of voluntary accounting changes. They also examine how the rate charged on the loan is affected by the exclusion of accounting changes. They find that the rate charged on the loan is 84 basis points lower when

voluntary accounting changes are excluded and 71 basis points lower when mandatory accounting changes are excluded. Beatty et al. (2002) conclude that excluding mandatory accounting changes may reduce the expected renegotiation costs of the loan in the event of an accounting change.

Evidence on the correlation between a firm's leverage ratio and closeness to covenant violation for private loans is provided by Dichev and Skinner (2002). They state that 'since we can measure covenant slack directly, we also assess the construct validity of firm leverage as a proxy for closeness to covenants. We find that while covenant slack and leverage are correlated, the magnitude of the correlation is fairly small in economic terms, implying that leverage is a relatively poor proxy for closeness to covenants.'

The results of these papers suggest that, while debt covenant calculations may provide an incentive for firms to change their economic behaviour in response to accounting changes in certain circumstances, this incentive may not be as prevalent as is often assumed; either because public debt does not contain financial covenants or because the covenants contained in private debt are not affected by the accounting changes. In addition, the results in these papers indicate that the leverage ratio is unlikely to be a good measure of a debt contracting incentive to change economic behaviour in response to an accounting change. Some suggest that leverage may instead proxy for the firm's target leverage ratio. However, the reason that firms would not adjust their target for the accounting change is not clear.

3.1.2. Compensation contracts

A second contracting incentive that has been considered is executive compensation contracts. In contrast to debt contracts that are explicit about how accounting numbers will affect contract calculations, typically bonus calculations are linked more loosely to specific accounting metrics. It is unclear whether the lack of specificity in the contract will make it more or less likely for accounting changes to result in changes in economic behaviour. On the one hand, compensation contracts provide more flexibility to adjust bonus calculations, on the other they provide no explicit exclusion of the effects of accounting changes.

There is some empirical evidence that bonus calculations do provide an incentive for firms to change their economic behaviour in response to accounting changes. Marquardt and Wiedman (2007) examine the economic consequences of changes in the financial reporting requirements for contingent convertible securities (COCOs). For a sample of 199 COCO issuers from 2000–2004, they find that issuers are more likely to restructure or redeem existing COCOs to obtain more

favourable accounting treatment when the financial reporting impact on diluted earnings per share (EPS) is greater, and when EPS is used as a performance metric in CEO bonus contracts. They conclude that these results provide new evidence that managers are willing to incur costs to retain perceived financial reporting and compensation benefits.

3.2. Regulation

For firms in regulated industries, the use of GAAP numbers in regulation potentially provides an incentive for changes in management behaviour. Theoretically regulators, like lenders, could modify the accounting numbers that are used in regulatory calculations to meet their specific needs, consistent with the views expressed by the FASB and IASB about specialised rather than general purposes. However, practical concerns that regulators may be captured by the industries that they are supposed to regulate have led regulators to frequently use GAAP numbers rather than regulatory accounting numbers. These GAAP numbers may be used in both capital regulation in the financial services industry and rate regulation in public utilities.

3.2.1. Capital regulation

To the extent that regulatory capital ratios are computed using GAAP numbers, changes in accounting standards created an incentive for affected firms to change their economic behaviour. However, some ambiguity exists about the effect of accounting changes on the calculation of regulatory capital ratios. In the US, the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) requires that regulatory accounting standards be no less stringent than GAAP. Compliance with this regulation results in changes in GAAP inducing changes in regulatory accounting standards. However, the board of governors of the Federal Reserve System (2005) has stated that:

‘Although GAAP informs the definition of regulatory capital, the Federal Reserve is not bound by GAAP accounting in its definition of tier 1 or tier 2 capital because these are regulatory constructs designed to ensure the safety and soundness of banking organisations, not accounting designations designed to ensure the transparency of financial statements. The current definition of tier 1 capital differs from GAAP equity in a number of ways that the Federal Reserve has determined are consistent with its responsibility for ensuring the soundness of the capital bases of banking organisations under its supervision. These differences do not constitute differences between regulatory reporting and GAAP accounting requirements, but rather are differences only between GAAP equity and the concept of

tier 1 capital as used in the Board’s regulatory capital requirements for banking organisations.’

This statement suggests that any given accounting change may or may not affect the calculation of regulatory capital ratios and therefore may or may not provide an incentive for a change in economic behaviour. Consistent with this ambiguity, Bens and Monahan (2006) discuss how the FASB Interpretation No. 46 (FIN 46) requirement that sponsors consolidate their highly leveraged asset-backed commercial paper (ABCP) conduits affected regulatory capital ratio calculations. These assets were assigned a zero risk weight by the regulator and therefore this accounting change did not affect the calculation of the risk-based capital ratios. However, this accounting change did affect the calculation of the leverage ratio, which for US banks is required in addition to the risk-based capital requirements, because GAAP assets are used in the denominator of leverage ratio. Bens and Monahan (2006) examine how sponsors of ABCP conduits responded to this accounting change. They find that the volume of ABCP began to decline upon the introduction of FIN 46 and that this decline is primarily attributable to a reduction in US banks’ sponsorship of ABCP. Also, they find that US banks entered into costly restructuring arrangements to avoid having to consolidate their conduits per FIN 46. They conclude that in certain settings, accounting standards appear to have real effects on investment activity.

3.2.2. Rate regulation

For rate regulated utilities, accounting changes can create a perverse incentive. D’Souza (1998) explains that for rate-regulated firms expense-increasing accounting standards have a positive effect on their cash flows because the rate recovery mechanism is based on accounting numbers. Managers of rate-regulated firms therefore have incentives to respond to expense-increasing accounting standards in ways that enhance the financial statement impact of the accounting change. She investigates the reporting and contracting responses of electric utilities to SFAS No. 106, which requires that other post-retirement benefits be accounted for on an accrual rather than cash basis. D’Souza (1998) documents that those managers of rate-regulated firms, which face greater uncertainties about future rate recoveries, have lower incentives to reduce employee benefits when adopting SFAS No. 106.

3.3. Market response

While the idea that changes in economic behaviour might result from accounting changes that affect covenant or bonus calculations seems to be widely accepted, there is considerable disagreement about whether managers might change their

economic behaviour to avoid a negative market response to an accounting change. Those who argue that the market can see through the effects of accounting changes argue that managers would not alter their economic behaviour for this reason. In contrast, survey results by Graham et al. (2006) suggest that managers are willing to sacrifice economic value to meet the markets expectations. In particular, they find that more than half of the survey participants state that they would delay starting a new project to avoid missing an earnings target.

Beatty (2006) examines banks' response to recent changes in accounting for Trust Preferred Securities that affect how these securities are reported in the balance sheet but do not change the calculation of regulatory capital. To examine whether the potential market response to this accounting change affected economic behaviour, the paper examines whether publicly traded banks and those with more uninsured liabilities were more likely to issue these securities before the accounting change, but not after. The results suggest that accounting changes can lead to changes in banks' economic behaviour even when the change in accounting does not affect regulatory capital calculations. This is consistent with bank managers acting as if they are concerned with the markets' response to the numbers reported after the accounting change.

3.4. Summary of incentives

The evidence suggests that while contracting incentives for behavioural changes may exist, they are not ubiquitous. Identifying when they exist is not trivial. Regulators determine whether regulatory incentives exist on a case specific basis. Behavioural changes occur when a regulatory incentives exists. Evidence on the importance of a market incentive is limited.

4. Suggestions for future research and conclusions

The issue of whether accounting standard setters should consider resulting changes in economic behaviour when writing accounting standards is controversial. For some, changes in management behaviour seem like an obvious consequence of accounting change, while for others the claims of behavioural changes are difficult, if not impossible, to prove. Additional research documenting the existence of behavioural change in response to accounting changes would strengthen the existing findings of the academic research that suggests that important accounting changes do result in changes in firms' operating and financing behaviour. There is even less consensus about the reasons for these changes. Changes in economic behaviour appear to be related consistently to the

regulatory use of accounting numbers. The evidence on the importance of debt covenants in inducing accounting changes is less convincing given that the proxies typically used to measure covenant slack have been shown to be poor. Research examining the contracting incentive using actual contract terms would be more convincing. Some evidence has also been found relating to incentives created by management compensation and by market discipline, although these two incentives have not been examined to any great extent. Additional research exploring a market incentive for changes in management behaviour seems warranted. A better understanding of why managers change their behaviour might help determine whether changes in behaviour are a good or a bad thing, at least from the perspective of the effected firm. This research is unlikely to be able to address broader social welfare concerns.

Regardless of this controversy over the effects of accounting changes on altering management behaviour, it seems relevant that standard setters should be interested in how economic behaviour changes as a result of their standards.

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Discussion of 'How does changing measurement change management behaviour? A review of the evidence'

Neil Chisman*

I would like to thank Anne Beatty for an illuminating and thought-provoking address. I have a few brief observations and questions under these five headings:

1. Why do people complain? Aren't the behaviour changes always a good thing?
2. Are there differences between the UK and the US?
3. What are the non-economic motives for behaviour change?
4. What should we do about this?
5. What should standard setters do?

To take the first point: why do people complain; are not behaviour changes always a good thing? I know that Anne said more research was needed. I understand that – I used to be an academic myself. I was not very good at it because I found I had no trouble forming opinions in the complete absence of facts!

Doubtless accounting standards changes cause changes in behaviour. I've done it and I've changed behaviour as a result of an accounting standard change. I am not proud of it – I can only plead that I was very young at the time! I cannot think of a single case where such a behaviour change was a bad thing, or even an unintended consequence. For example, the standard dealing with off-balance sheet financing was overtly aimed at stamping out bad practice. Banks were openly marketing schemes to circumvent accounting standards. Prudent finance directors might not have liked them, but they could not refuse their pushy chief executives. Consequently, companies carried risks that they did not understand and that investors did not understand. The standard stopped all of that.

Or pensions accounting: I was a member of the Financial Reporting Council when the UK Accounting Standards Board introduced accounting standard FRS17 *Retirement Benefits*. A high-profile council member made an impassioned

address saying that it would be the death of the British defined benefit pension scheme. A much lower-profile member responded that this would be a good thing because such schemes were widely misunderstood and mismanaged. It did indeed cause the decline of defined benefit schemes; I believe that was because managements and investors began better to understand the liability that they were carrying.

If a proposed accounting change is foreseen to cause a bad change in behaviour, then standard setters should respond to comment to that effect in the discussion phase, and I think they do. Perhaps the impassioned debate reflects differences of opinion on whether the foreseen behaviour change is a good or a bad thing.

There were some elements in Anne's presentation that made me ask if there were differences between the UK and the US. For example, do bonuses and remuneration really drive undesirable behaviour changes? I suppose it is not completely out of the question here in the UK. However, bonuses are normally awarded at the discretion of the remuneration committee, who would usually be expected to adjust for any engineered results, and the behaviour changes themselves are likely to be matters reserved for the full board.

Consequently, it is not really open to executive directors to tinker with the results without the agreement of non-executives merely to enhance bonus payments. Indeed, the whole area of window-dressing, involving such actions as making and releasing provisions to smooth the results, is much more constrained than it once was.

From this side of the Atlantic it can seem that the 'show me where it says I can't do this' mentality is quite rife in the US. It may indeed be less common over here now, but we must not forget that during the 1980s disciplines were disgraceful in the UK. It was perfectly normal to look for ways to circumvent accounting standards and there were some awful scandals. But there was a thorough clean-up in the 1990s, with David Tweedie at the ASB, with the Cadbury Committee on Corporate

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Governance, and with the Financial Reporting Review Panel scaring people to death. My perception is that it is now quite unusual to push the boundaries.

What, then, are the non-economic motives for behaviour change? Behaviour might change simply because management wants to do the right thing, both in the positive sense of wanting to earn one's place in Heaven, and in the negative sense of protecting one's back and not wanting one's face on the front page of a tabloid newspaper. Managements do care deeply about their reputations.

Anne mentioned that the debt:equity ratio, which we call gearing and which Anne calls leverage, is a poor proxy for tightness of debt covenants. I do not think it is any proxy at all; it is actually more stringent and more important. It is usually gearing that drives the behaviour change and not debt covenants. Debt:equity ratio is a guide to long-term financing stability, an indication that you are likely always to be able to borrow. I would expect a company's policy on gearing to be tighter than the debt covenants. It would be reasonable, for example, for a company to set a policy that the acceptable range is from 40% to 60%; any lower – as Anne's example quoted – would appear as unambitious, with the company needing to find good investments or return cash to shareholders. Any higher and the route back down must be clear. This is where the standard on off-balance sheet financing had its effect by demonstrating that companies' gearing had been pushed past acceptable upper gearing limits.

Perhaps the best and the most benign motive for behaviour change is simply increased understanding of the issues leading to better decisions. In my experience, this is the most common – and you might say that this is what accounting standards are actually for.

Behaviour change happens because people do not always act rationally in practice, and markets are far from perfect. In principle, all decisions within a company should be made by selecting the option which maximises the net present value of future cash flows, either directly by maximising the cash flows themselves or by lowering risk and the weighted average cost of capital.

If people consistently acted rationally in this way, then an accounting change would not induce a behavioural change. When it does, it implies that there was something wrong previously, that some area of irrational decision-making is being corrected. Hence the demise of the defined benefit pensions, as people understood the liability more

completely, and the cessation of off-balance sheet financing as people understood better the risk of excessive gearing.

It is not only on the management side that better understanding is required. Ten years ago, there was an investor-driven move for hotel companies to sell big hotels and retain a management contract. It was argued that a revenue stream on 'no capital employed' had to be good business. Actually, this is usually value destroying because there are substantial extra costs, the revenue stream is no longer a perpetuity, and most of the benefit of improved trading performance passes to the new owner. Investors can and do bring irrational pressure to bear on managements. Indeed, investors are often cited as being more than willing participants in the strategy that brought down Marconi.

What, therefore, do we need to do? We must make a fundamental change in the way we account and report, in order to give both sides – management and investors – greater clarity and understanding that what matters is the net present value of future cash flows. If accounting standards can make the dialogue between investors and managements focus rationally and constructively on value creation rather than short-term profits, then there will be much beneficial behaviour change and we will all get richer.

What should standard setters do? Anne quoted Jim Leisenring as saying: 'Standard setters must continue to produce standards giving neutral decision-useful information,' and I agree with that. Decisions will then become more rational, and any changes in behaviour will be beneficial.

Let's not underestimate the task. Global standards are far from harmonised, and even the best are not yet very decision-useful. Progress is hampered by market participants' inability to agree, to reach a consensus, even on trivia like terminology. We have bickering; woolly thinking; partisan positions; poor to non-existent listening skills; arguments about the number of angels that can dance on a pinhead; and even political interference.

The standard setters are uniquely placed to rise above all this, to see the big picture, to show technical excellence, to lead opinion and to drive consensus about what needs to be done. The standard setters must not let themselves get bogged down in the trivia that we mere mortals indulge in; otherwise we will make no progress. The standard setters must lead – they must lead the world towards harmonised, high quality, decision-useful accounting standards, and it would be nice if that could be soon.

Overview

Lindsay Tomlinson*

At my first meeting at the Financial Reporting Council, one of the members said: 'To resolve this particular issue, we first have to decide what the accounts are for.' Whereupon a more seasoned council member than I raised his hand and pointed out that as the profession had been debating that topic for the last 150 years, we were unlikely to resolve it in the next one-and-a-half hours! The current debate has some of that flavour to it. Our great-great-grandchildren will probably be debating measurement and the use of fair values in 100 years' time, and let us hope doing so in Chartered Accountants' Hall.

I am the first 'normal' practitioner to speak at this conference. Everyone else you have heard from so far is an expert, many of whom make a living from explaining financial reporting to ordinary investment managers like me. It could be said that they are information and disclosure junkies; they just cannot get enough!

As has been pointed out, it has been difficult to engage the end users, the investors, in the accounting standards debate. Why is this? I know it's hard to believe, but many people find the accounting standards debate esoteric and even slightly boring. They obviously haven't attended conferences such as this one.

More plausibly, many investors with an accounting bent are much more interested in exploiting anomalies rather than fixing them. And the killer fact is that, despite all the imperfections, markets do a pretty good job of valuing companies. There are no free lunches out there. One approach might be to ask, as an investor, why spend time trying to fix something that now works tolerably well?

I take a less sanguine view than this. I have great respect for the work done both by academics and by the International Accounting Standards Board in this area. While it is tempting as the practical person to leave the debate to others, I am greatly aware of the truth of Keynes' observation, 'that even the most practical man of affairs is usually in

the thrall of some long dead economist'.

This is a deeply important debate. As my contribution, I want to touch on three separate topics: first, about what do investors really care? Second, what is an investor's core activity, and how does that impact on investors' use of financial statements? Third, what has all that to do with the discussions we have enjoyed at this conference?

I have found that there are three things that excite investors in the financial reporting area.

First, they think the accounts should be for them. Investors do not like general-purpose financial statements; we think the accounts should be prepared for the shareholders, the owners of the business, and although we are not the owners (we are actually standing in front of pension fund beneficiaries and insurance policy holders, who are the true owners) we think that the financial reports should be directed to us as, agents of the ultimate owners. And if financial reports are prepared for shareholders, then other users can probably get the information they need from those reports.

Next, stewardship: we as investors want to hold managements to account. Financial reporting has to give us the information we need in order to do so. We want to look backwards as well as forwards.

Third, UK investors are fixated on the true and fair view. That is the principles-based approach. As has been said, in this country we did not have problems such as Enron, WorldCom and Parmalat. We are strongly committed to a principles-based approach and it was fascinating to see Hank Paulson (US Secretary to the Treasury) recently endorsing this approach and suggesting that the US should move in our direction. But in a litigious society like the US, I think rules will continue to hold sway. People need safe harbours. That is a real problem for the convergence project. Investors here lack enthusiasm for convergence to a rules-based approach. It really is a big deal for us.

These are the hot buttons for investors.

I said I would describe what investors actually do. What is our core fundamental activity? Ultimately, we arbitrage between price and value. That is true of any investor operating in public

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markets. For each possible investment such as a company stock or a bond, we know its market price on a continuous basis. We then need to place a value on that stock or bond and make investment decisions based on the difference between the known price and our estimates of the value. We want to find differences between them, and we want to be different to the other investors as well – it's competitive. That is where we add our value.

What are our main tools for estimating value in this game? Basically, there are two; namely net asset value and recurrent earnings. The latter are generally much more important to us, even though I have learnt at this conference that they are impossible to define – it's what we really care about. We are not looking for financial statements to value a company. We want them to give us adequate information to do so. I would contend, as I said at the start, that the market as a whole does a pretty good job of valuing companies. What we are interested in is the underlying business model and the fundamental economics of a business. When we meet companies, we are trying to see them through the eyes of their managements. As Philip Broadley commented, when we meet we talk about the business, not about accounting treatment, except when we really have to – that discussion is generally a two-minute coda to a meeting. We are really trying to understand what is going on within the business, not within the financial statements.

One other important point is that we are particularly interested in something that was not much talked about yesterday, which is cash generation. That is what really cuts through to the fundamental economics of a business. I follow George Orwell's lead in this. He took the famous biblical passage in 1 Corinthians about 'love', and substituted 'money' for 'love'. He was proving a point about capitalism. But, if you substitute 'cash' for 'love', you get pretty close to where the investors stand on this. Cash generation is incredibly important to us. It cuts through all the quirks of accounting treatments.

Finally, what has all this to do with the papers presented to this conference (which, by the way, I thought were uniformly excellent)? I am not sure to what extent we are now violently agreeing with ourselves, but I get the strong impression that there is a 'fair value' camp that wants to place a fair value on everything. Parenthetically I would mention that the term 'fair value' is very prejudicial – we should say 'modelled market value' in this context. There is a pragmatist camp consisting of people who are happy to fair value financial instruments and other market assets, but who want to stick with historic cost transaction reporting. That was exemplified by the debate between Mary Barth and Stephen Cooper yesterday. It is no surprise that I sit firmly in the second camp. I do not think we need to transform what we are doing; I think we should incrementally fix the problems we come across, rather than seek to move to a completely different framework. It may be that all of us are actually in agreement on that, but it is not at all clear to me that this is the case.

Stephen Penman's paper was most helpful in explaining why fair values give me such a problem. As I said, I want to value the company and I do not want it done for me. And I want to use income as the predominant factor in so doing. Taking away my income numbers will remove the major tool I want to use. It is no wonder that investors find this so perplexing.

As a final aside, it is gratifying that people have been able to prove to themselves that management will bias numbers in their favour if they are given the latitude to do so.

Where do we go from here? I am in agreement that much more research will help, but I suggest one useful research project would be to examine the way that investors view financial statements. There is quite a commonality of view between the preparers (the corporates) and the users (the investors). Looking at how each of those operates would be a major contribution to the debate. Thanks again for giving me the opportunity of contributing.

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Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the paper shares data with another paper, an electronic copy of the other paper must be provided. Authors of accepted papers will also be asked to assign exclusive copyright to the publishers.

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Accounting Standards Steering Committee (1975). *The Corporate Report*. London: ASC.

Tippett, M. and Whittington, G. (1995). 'An empirical evaluation of an induced theory of financial ratios'. *Accounting and Business Research*, 25(3): 208–218.

Watts, R.L. and Zimmerman, J.L. (1986). *Positive Accounting Theory*. Englewood Cliffs, NJ: Prentice Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B.; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelt with an 's', not a 'z'. Single quotation marks should be used, not double.

